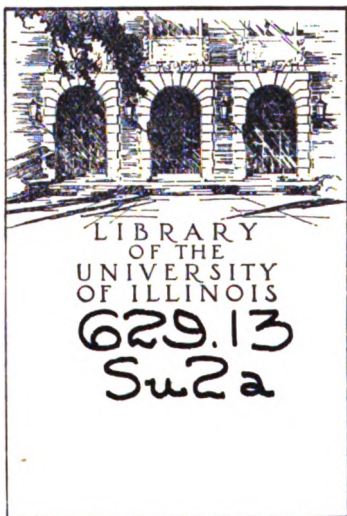

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PLATE 1



By W. Russell Flint, A.R.A.

PER ARDUA AD ASTRA

In memory of all ranks of the Royal Naval Air Service, the Royal Flying Corps, the Royal Air Force, and those Air Forces from every part of the British Empire who gave their Lives in Winning Victory for their King and Country.
1914-1918

AIRMEN OR NOAHS

FAIR PLAY FOR OUR AIRMEN

THE GREAT "NEON" AIR MYTH EXPOSED

BY

REAR-ADMIRAL MURRAY F. SUETER

C.B., R.N., M.P.

AUTHOR OF "THE EVOLUTION OF THE SUBMARINE BOAT, MINE AND TORPEDO"
NOW MENTIONED R.U.S.L. PRIZE ESSAY, 1904, TECHNICAL PAPERS ON AIR SUBJECTS

FORMERLY INSPECTING CAPTAIN OF AIRSHIPS, 1909-12

DELEGATE TO INTERNATIONAL CONFERENCE ON AERIAL NAVIGATION
HELD AT PARIS, 1910

DIRECTOR OF ADMIRALTY AIR DEPARTMENT, 1912-15

MEMBER OF FIRST WAR AIR COMMITTEE

SUPERINTENDENT OF AIRCRAFT CONSTRUCTION, 1915-17

IN COMMAND OF R.N.A.S. UNITS, SOUTHERN ITALY, 1917-18

With Illustrations in Colour by

W. RUSSELL FLINT, A.R.A., R.W.S.

AND

Illustrations in Black and White by

WING-COMMANDER E. G. O. BEUTTLER, O.B.E., R.A.F.

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Luza

DEDICATED
TO THOSE GALLANT PIONEER AIRMEN WHO MADE
THE SUPREME SACRIFICE IN THE
GREAT WAR TO GAIN
VICTORY

THE PIONEER

Upon this marble bust that is not I
Lay the round, formal wreath that is not fame :
But in the forum of my silenced cry
Root ye the living tree whose sap is flame.
I, that was fierce and valiant, am no more—
Save as a dream that wanders wide and late,
Save as a wind that rattles the stout door,
Troubling the ashes in the sheltered grate.

The stone will perish ; I shall be twice dust.
Only my standard on a taken hill
Can cheat the mildew and the red-brown rust
And make immortal my adventurous will.
Even now the silk is tugging at the staff ;
Take up the song—forget the epitaph.

EDNA ST. VINCENT MILLAY.

▼

ACKNOWLEDGMENT

THE Author's very grateful thanks are due to Captain W. Russell Flint, A.R.A., R.W.S., and Wing-Commander E. G. O. Beuttler, O.B.E., for their very great kindness in volunteering to help in illustrating this book.

PREFACE

WHEN I collected my last sheets from the confidential typist at the House of Commons, whom I am indebted to for the skilful way she deciphered my technical terms, I noticed she was smiling, so I asked her the reason, and as the reply struck me as being as singular as it was unbiased, I cannot help repeating it—

“Admiral, I am very sorry your book has come to an end. We were deeply interested. Both my assistant and myself felt how much you must have enjoyed writing every word of it, and didn't you get your own back on the Noahs ! ”

HOUSE OF COMMONS,
1928.

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I speak bare truth,
As if to thee in private talk.

WORDSWORTH.

INTRODUCTION

ALL thinking people who desire to see our country really great and taking a prominent place amongst the nations of the world in scientific development in all its branches must have been disappointed with a book recently published dealing with air problems, entitled *The Great Delusion*. Some of the statements in this work are so extraordinary, so extravagant, and so inaccurate that, as an old air pioneer, I feel I cannot let them pass unchallenged, and I am strengthened in this feeling when I read in one of our leading daily papers¹ that—

The Great Delusion by "Neon," recently reviewed in these columns, is one of those books whose effect does not appear at once, but which works like leaven in the mass of public opinion. As it contains a reasoned, a detailed, and an impartial indictment of the policy of this country with regard to aerial defence and aerial communications, we have waited with some curiosity for any challenge to the statements of "Neon," or any refutation of his arguments. So far as we are aware, an eloquent silence has prevailed.

It is difficult to meet with equanimity a challenge that deals with such a vast and highly scientific subject as the air in loose generalities and much inaccuracy.

The publishers informed us that *The Great Delusion*, in the opinion of the introducer, Mr. Arthur Hungerford Pollen, is the most important book on air problems in peace and war which has appeared since the War, and again, that "The association with this work of so well-known an authority as Mr. A. H. Pollen is an ample guarantee that the author's conclusions are based on sound premises."

May I be permitted to insert my analytical probe into the introducer, and twist it round by asking: What is Mr. Pollen an authority on?

¹ *Morning Post*, Thursday, 12th May, 1927.

The Great Delusion, we are told, treats of the laws governing flight and the facts about air operations in peace and war.

One thing is certain, and that is Mr. Pollen is not a practical airman.

Is he, then, an authority on aerodynamics? May he be an expert on the dynamics of the pterodactyl? or perhaps problems dealing with planes in pterygoid aspect may appeal to him.

I recall that nearly twenty-five years ago, the Director of Naval Ordnance¹ sent for me when I was serving as experimental electrical Commander in his department at the Admiralty, and instructed my gunnery colleague and myself to look into the details of a system of fire control for heavy guns that had been placed before him by Mr. A. H. Pollen.

Our chief was an able and very far-seeing gunnery expert, who thought Mr. Pollen's proposals, though crude, might be of value to the naval service.

We interviewed Mr. Pollen more than once, went into his calculations very carefully, and, after searching investigation of his proposals in much detail, we were able to report that Mr. Pollen's schemes, if developed, had great possibilities.

Having helped Mr. Pollen to place a portion of one foot on the ladder of fame, I watched his climb to success with much interest.

Mr. Pollen, in addition to being a pioneer of naval fire control, has been connected with other sound ventures, and no doubt he is a business man of some repute.

When the War was over, there were naturally rival claims to the origination of fire control for the Naval Service, and we saw Dreyer's² bricks being thrown at Pollen's head, and Pollen pitching bricks which Dreyer dodged successfully.

The little storm in the fire control teacup was amicably settled, and Mr. Pollen was awarded a very substantial sum for his fire control pioneer work, and, in my judgment, he richly deserved all he received.

¹ The late Admiral Sir Henry Barry, K.C.V.O.

² Now Rear-Admiral F. Dreyer, C.B., a pioneer of Naval Fire Control, one of our greatest gunnery experts and a rapidly rising Flag Officer.

Mr. Pollen also became a naval author, for his book entitled *The Navy in Battle*, although biased in no small way and with some inaccuracies, was very good reading. In writing this book, the doors of the Admiralty appeared to be very wide open to the author, a civilian, far more than they were to me when I wrote my submarine book.

But I have no knowledge of Mr. Pollen ever having taken any active part in any way directly or indirectly with aircraft development for the Services or for civil aviation.

Moreover, I have searched diligently for his name in connection with air research work in the laws governing flight, but have failed to find any material fact of substance that would indicate that Mr. Pollen has earned the right to become a critical authority on air matters.

In these modern days uninformed criticism of everybody and everything is cheap and abundant. When we were developing submarines for the British Navy we had much of it and smiled. When we were successful in our first stages of air development the very walls of certain Whitehall buildings cracked with the heat generated in some of the rooms by hostile criticisms of the young airmen that were then beginning to compete successfully with their Blue-water and Army colleagues for public favour.

The airmen knew it was unnecessary to indulge in propaganda. Their many achievements before, during the Great War, and after, are the best indication of their efficiency. They smile at criticisms. Because they know that destructive criticism with no creative suggestions based on second-hand information can have no value whatsoever to the instructed mind.

Unfortunately, we have had in the Army and Navy so many people who will not look at new ideas with anything but open hostility.

To some extent this is natural in such conservative services. But it should not be overdone, and those men¹ of vision who occasionally come forward in the Services with some new

¹ Such as Major-General Sir Ernest Swinton, K.B.E., R.E. ; see page 212.

invention or scheme should not be called upon to waste their valuable time in having to combat those who always take the microscopic, if not myopic, view. Those sort of people never do anything worth doing, and never get anywhere. The elderly men in Whitehall did not understand their airmen or have the ability to understand their purpose. Their energy exhausted itself in fault finding and a constant grouse that all airmen were an infernal nuisance.

Perhaps the last straw, which caused the largest crack in the foundations of the Admiralty buildings, was when, in spite of the croakings of all the pessimists who looked upon everything connected with the Admiralty Air Department with the cold eye of prejudice, the naval airman's caterpillar landship proposals, as laid before Mr. Churchill when First Lord of the Admiralty, were perfected by that very able engineer, Sir William Tritton, into the tank, that on active service swept all before it.

One brother officer in a high position, much to my hardly-concealed amusement, even took the trouble to come into my room at the Admiralty to inform me with almost ill-concealed glee that my caterpillar landship, tank, or any damned thing I liked to call it, was a perfect failure at the front, as it had gone over a poor wounded soldier and squashed one of his legs flat! He forgot to mention the thousands of lives¹ that would have had to be sacrificed had we not developed the airman's caterpillar landship to assist our Tommies in the Great War.

Pinpricks of this nature were merely stupid. They showed the airmen that certain people in high positions had forgotten to think clearly. One or two of these occurrences I will record in the pages of this book, not out of any feeling of hostility, but to show the attitude of some silly people towards air development. The airmen, with their usual modesty, and having the greatest faith in the future development of the air, laughed at these childish outbursts, and remembered that new times bring new thoughts. A study of air problems had showed them

¹ See General Seely's opinion, page 215 and plate 48.

that new conditions demanded new methods. Modesty was not the only attribute of our pioneer airmen. They preserved a balanced judgment, which effectively deterred them from over-estimating or over-stating what they could accomplish.

The desire of all airmen is that our country should keep in the forefront of military and civil air development. They built up a great Air Service for naval and military needs during the War, and now they are not quite assured that the refreshing fruits of Locarno will cure all European ills, for they are well aware that certain negotiations have been going on with regard to the development of aircraft construction in Russia, and that this has been actively encouraged by the German Minister of War. Whether a military convention exists between these countries to enable Russian machines to be placed when required at the disposal of Germany is unknown. But it is known that Russia has acquired a considerable amount of air technical knowledge from Germany and is establishing a large number of aircraft factories.

Looking towards Southern Europe, many may have noticed that Signor Mussolini made a speech on the 27th of May, 1927, in which he said—

The spirit of Locarno has evaporated. Everybody is arming. Italy must arm . . . Italy must be able to mobilize 5,000,000 men and to arm them . . . and our air force . . . must be so numerous that the surface of their wings must obscure the sun over their land.

And on reviewing the Italian fleet at Ostia, when addressing the officers of the battleship *Cavour*, he said¹—

The present times are not generally calm. The results of the Conference on Naval Disarmament, which I characterize euphemistically as crepuscular, show the necessity for being morally ready in order that we may be ready physically when the King calls.

Conflicting interests in the Adriatic, as Signor Mussolini knows only too well, may at any time give rise to questions of much gravity.

Storm centres exist in Austria, Rumania and Hungary, and

¹ 15th July, 1927.

as long as the separation of Eastern Prussia from the Reich, as arranged by the Peace Treaty of Versailles, allows Poland to possess the corridor on the left bank of the Vistula, which creates a far more bitter thorn in the side of Germany than ever Alsace and Lorraine did to France, real peace in Europe is likely to be remote.

Our difficulties in China have necessitated squadrons of machines being dispatched to the Far East, and additional seaplane carriers have been sent to reinforce the China squadron. Airmen are aware that the Chinese problem of to-day has been fomented by the Bolshevik alliance with the Chinese Nationalists, in supporting the doctrines of the late Dr. Sun, who, after throwing overboard the Manchu Monarchy in 1911, made famous his slogan: "Government of the Chinese people, by the Chinese people, for the Chinese people," and they are not unmindful that a similar problem may extend to India in the near future.

Airmen should not forget the advice given by the late Sir Eyre Crowe, one of the finest thinkers the Foreign Office ever possessed, when, a few days before the Great War commenced, in 1914, he wrote—

The theory that England cannot engage in a big war means her abdication as an independent State. She can be brought to her knees and made to obey the behests of any Powers or group of Powers who can go to war.¹

Many of us consider that, if this principle is accepted, then it is prudent, until universal disarmament amongst nations is more developed, for this country to keep an efficient Navy, Army, and Air Force. In arranging a suitable standard for these three forces, not only defence must be considered, but our great world responsibilities, with our 80,000 miles of trade routes to protect, must ever be before our eyes. Also our Navy, Army, and Air Force must be kept to the highest pitch of efficiency to enable us to take a firm stand at the conference table should our just rights be challenged. If we do not do

¹ Memorandum to Sir Edward Grey, 31st July, 1914.

this, we shall soon decline as a great nation in international affairs.

Surely we should listen to the successful sailors and soldiers, such as Jellicoe, Gough-Calthorpe, Tyrwhitt and Beatty, Haig, French, Robertson, and Allenby. Political officers of ripe experience, as Cox, Maffey and Dobbs, rather than to "Neon," who would appear never to have seen an aeroplane outside a book or toy model.

What really counts are the views of the men who actually used aircraft or witnessed what they could achieve on the field of battle or at sea, or in Iraq or on the North-West Frontier of India.

With regard to civil aviation, the airmen desire to link up the most distant parts of our Empire by means of airships, aeroplanes and seaplanes.

Those who hamper air development, often through lack of knowledge by an inadequate study of air problems, are rendering a real disservice to their country.

They should encourage rather than "crab" air enterprise in all its branches. If they are pure pacifists and do not believe in using the air for military purposes, let them encourage the development of civil aviation. If they do not believe in forging air links of Empire, let them advance civilization by encouraging the linking up of all nations of the earth by a network of air lines in exactly the same way as many up-to-date countries are establishing most successfully electricity grids throughout the lands over which they have sovereign rights.

The airmen know the limitations of the air better than those who criticize air development. But the great flights that have been made in the last few years show how distances as we previously knew them are being steadily diminished by the airmen.

This is good for the future, as no longer will those of our countrymen and women engaged in developing the great estates of our Empire, living at up-country stations, be so cut off from the centres where men and women congregate and live.

Why "Neon" should attempt to curb air development and block quick intercourse in time of need or sickness for those patriotic folk who do so much to build up our Empire in distant lands it is not easy to fathom.

"Neon's" book is undoubtedly an ingenious publication. It contains much accurate information, but it is stated in a misleading and partial manner. Clearly the author has no first-hand knowledge of the air. The book is full of elementary technical blunders that would fill pages of foolscap when tabulated. To refute these many errors in detail would take a book the size of the *Encyclopaedia Britannica*. This would be dull reading, so I have pursued the course of concentrating principally upon my own personal experiences in giving a frank narrative in simple words. This will enable the reader to obtain an insight into the value of air effort, and form his own estimate of the truth, whilst my book will be more readable than a dull, formal treatise.

It is quite erroneous for "Neon" to use the words "engine speed"¹ when presumably "ground speed" is what is meant by this air critic, who does not appear to be aware that "engine speed" is measured in terms of revolutions per minute.

Then, to compare aeronautics, a new branch of scientific engineering, with the old-established one of ship construction or railway engineering shows a lamentable lack of vision.

The chapter on "Hopes and Failures, Disasters," etc., displays an equal lack of sense of proportion. Airships are not likely to be any better or any worse than surface ships or submarines in their early stages of development. As far as I am aware, the first designs of airships are not claimed by the aeronautical engineer or the airmen to be perfect, any more than Admiral Sir Reginald Bacon would have claimed that "No. 1" Holland or "A 1" submarine was perfect.

One alteration to Submarine "A 1" that I remember cost fifteen hundred pounds. This boat was a splendid diving boat. But she was in one respect a failure, and that was through

¹ *The Great Delusion*, page 179.

an imperfect form ; we could never get a good speed out of her.

Take the case of racing yachts, racing motor-boats and racing motor-cars. Some very often undergo a trial or two and they are then scrapped, although they may have cost thousands of pounds.

Both in airships, aeroplanes, seaplanes, yachts, motor-boats, motor-cars, submarines—each one built or each special type is usually an improvement on the last.

Some deletions must take place, otherwise you would never arrive anywhere. If the inspirer of "Neon" had been a submarine man who had gone through the strenuous and very difficult days of introducing submarines into the naval service, he could not have shown such bias against air development. In fact, air hostility could scarcely be carried farther, and the deductions are so overdrawn that they merely emphasize the motive of the book, which a more experienced author would have handled with greater wisdom.

The first is to minimize the work of all airmen.

The second is to obtain for the person or persons who caused the conception of "Neon" high praise from those who have for years worked against the airmen and wished them ill.

These delightful persons work underground. They usually prefer to remain among moles and are afraid to come into the open. Some airmen know them well. The inspirers of "Neon" are welcome to all praise from this quarter. But no author, within my recollection, has received such a just and well-reasoned castigation as the writer of "Neon" received at the hands of the very able editor of our best Sunday journal. For in the *Observer*,¹ Mr. Garvin, after reviewing this futile reactionary effort at some considerable length, remarks—

A better title to this book would be *My Great Delusion*, by Noah. This perhaps does some injustice to the father of navigation, who owed no little to the scouting services of the birds.

¹ *Observer* of 27th March, 1927.

Mr. Garvin thus reminds us of the "Dove" and "Raven" in Holy Writ, for do we not find therein written¹—

And he stayed yet another seven days : and again he sent forth the dove out of the ark and the dove came in to him in the evening : and lo ! in her mouth was an olive leaf pluckt off : so Noah knew that the waters were abated from off the earth.

Noah thus relied on aerial reconnaissance in emergency in his 60rst year to bring him the intelligence that "the waters were dried up from off the earth."² According to Bible reckoning, I am told by an ecclesiastical authority³ that this would correspond to 2347 B.C., or more than four thousand years ago.

Yet the Noahs of Whitehall refused to recognize the full value of air reconnaissance for naval work from 1909 onwards, as herein disclosed.

Those who honour me by reading these pages must not think that any pioneer naval airmen have grievances. On the contrary, I feel confident that most of them are not only proud, but mighty proud, and can hold their heads high when they recall that in pursuance of their duty they have been able to contribute a part, however small that part may be, to air development.

My apologies are due to the reader for the lack of polish in my book, as I have little time and the sailor's usual inexperience of literary work.

¹ Genesis, Chapter IX, verses 10 and 11.

² Genesis, Chapter IX, verse 13.

³ The Rev. H. J. Oliver, Bengoe Rectory, near Hertford, Herts.

OUR FATHER

The Navy is our Father (in the strictly legal sense
That binds an obligation just of shillings, pounds, and pence) ;
A parent so neglectful of us children of the Air,
That had not hope maintained us we'd have died of sheer despair.
For our Father didn't want us and he didn't want to know
What it was we wanted or the way, the why, or wherefore, so
When lurid lights of warfare first came flashing through the sky
Our Father quite forgot us and the fact that we could fly,
Till someone chanced to tell him in a non-committal way
That if he cared to notice there was Purpose in our Play.
So Father grew uneasy, for he found he had to own
That he was going reaping where he knew he hadn't sown ;
So then he turned and mocked us to his everlasting shame,
And even took exception to the fact we bore his name.
But while he fumed and fretted in the grandeur of his mists
Whenever there was fighting we were entered in the lists ;
And we have wrought our purpose so to seek out and destroy
The forces of our foeman and those in his employ ;
And now we're feeling restless for we feel that we could—well,
Such funny things do happen that it's very hard to tell.¹

¹ "Our Father." An indictment of the Navy's attitude towards the Royal Naval Air Service, written in 1917 by that very gallant and talented airman, the late Squadron-Commander Douglas Hyde-Thomson (Lieut.-Commander, Royal Navy).

AIRMEN OR NOAHS

CHAPTER I NAVAL AVIATION

(I) A SEAPLANE AT JUTLAND

FROM the preface of "Neon's" book I extract the following, written by Mr. A. H. Pollen—

In the chapters which examine the performance of aircraft in the War the cold logic of our author's facts show that despite all the heroism and skill, despite the hideous casualty list and the enormous sacrifice involved in the wealth and man power devoted to this arm, the actual contribution to victory is pretty hard to find.

Where can I go for one or two simple facts to combat this extravagant statement? Shall I have to search much or far?

Could I find a nearer place than in Mr. Pollen's own library, or better pen than his very own? In his interesting book, *The Navy in Battle*, I noted this kindly passage by way of dedication to the personnel of the British Navy—

So thorough is your work that Britain stands to-day on a pinnacle of power unsurpassed by any nation at any time.¹

Noble words, indeed. Do they not exude "Victory"? Then in a later chapter there is this interesting passage—

The Fifth Battle Squadron, which we must suppose originally to have been on Sir David Beatty's left, was coming up behind the battle cruisers as fast as possible.

The Second Light Cruiser Squadron, leaving the screening functions to the First and Third, made full speed to take station ahead of the battle cruisers, where two flotillas of destroyers were already.

While these movements were proceeding a seaplane was sent up from *Engadine*, which, having to fly low on account of clouds, pushed

¹ *The Navy in Battle*, Chapter I, page 4, para. 3.

to within 3,000 yards of the four light cruisers of Von Hipper's advance force.

Full and accurate reports were thus received before the enemy was sighted in the distance.

Lord Jellicoe¹ writes in connection with this incident—

On receipt of *Galatea's* report, Sir David Beatty ordered the *Engadine* to send up a seaplane to scout to the N.N.E. This was the first time that seaplanes had been used for reconnaissance work with a fleet in an action, and the event is notable for that reason. The low-lying clouds made observation difficult, but the seaplane, with Flight-Lieutenant F. S. Rutland, R.N., as pilot, and Assistant-Paymaster G. S. Tewin, R.N., as observer, was able, by flying low under the clouds, to identify and report four enemy light cruisers, the report being received on board the *Lion* at 3.30 p.m. The seaplane was under heavy fire from the light cruisers during the observation.

As these naval operations at Jutland by Lord Jellicoe had a distinct bearing on the surrender of the German Fleet, may I not claim that my little seaplane gave, though small, a direct contribution to victory?

But where was the *Campania*? She had a fine equipment of machines of the Short and Sopwith "Schneider Cup" seaplane types. I have never yet learned the reason for her absence from the Grand Fleet at Jutland. She had one of our keenest and ablest naval air experts as captain² and a good complement of pilots and mechanics.

Her machines are certain to have been useful had they been used, and the question arises, who is responsible that the *Campania* was not informed that the Fleet was sailing, as I understand she was left behind?

It appears to me that somebody on the staff let Lord Jellicoe down badly in not getting the proper signals through to the *Campania*. Further, seven months before Jutland I asked to be allowed to build 200 invisible winged (as far as I could get them) torpedo machines. But the construction of these machines was not approved. I feel certain they could have

¹ *The Grand Fleet*, 1914-16, page 323.

² Now Air-Marshal Sir Oliver Swann, K.C.B.

inflicted considerable damage on our enemy in the early morning after Jutland, and in support of this view may I relate that three enemy vessels were attacked in the Dardanelles¹ by our Short type seaplanes; three locomotive Whitehead torpedoes were fired, and three hits were made—100 per cent of hits, Reader!

Again, after the Armistice the battleship *Malaya* was attacked with eight torpedo machines, and seven hits were obtained. The value of the torpedo machine lies in that it can attack on any bearing, whereas the submarine has to get within the danger angle, which is usually from a right-ahead to a bearing on the bow; otherwise she is outside torpedo range in making an ordinary attack on a cruiser or battleship.

I have always been convinced that if the naval airmen had been allowed to develop proper aerial reconnaissance of the North Sea, we could have done so much better on the naval side throughout the whole War period. The lack of British Zeppelins at Jutland was no fault of Lord Jellicoe.

He pressed on the Admiralty more than once when Second Sea Lord, as can be seen by the official papers, the advisability of developing rigid airships, and he even went so far as to fly in a German Zeppelin before the War, when he was Controlling Sea Lord of the Air Service, to gain practical experience of this type of aircraft.

Unfortunately, Lord Jellicoe did not remain long in charge of the Naval Air Service, but he showed he was full out to help. His advice to the Admiralty fell on deaf ears. They were not keen on developing aircraft. Neither did they pay heed to the advice of their airmen until too late. The records in proof of this statement have been carefully preserved and are available at any time for perusal by those interested. When too late to be of the slightest use in the War, the Admiralty ordered several Zeppelins and hundreds of torpedo aircraft.² Reader,

¹ Page 49.

² I showed Mr. Churchill and Lord Fisher a successful torpedo machine at Calshot in the summer of 1914.

imagine the feelings of some naval airmen who for years and years had pressed for naval air development to see the Admiralty wake up and the orders for these Zeppelins and torpedo aircraft given too late !

In the *Royal United Service Journal* for 1927, in dealing with the lessons of Jutland, Admiral Harper writes—

At Jutland it is possible that the C.-in-C. would have had a far better idea of the situation if, instead of being dependent on reports from his cruisers and his own limited range of visibility, he had been in the air ; but it is quite certain that the difficulties in communication and staff work involved would have made it quite impracticable for him to have conducted the battle from an aeroplane at that time. The conclusion to be drawn seems to be that in future a thoroughly trustworthy staff officer—possibly the Chief of Staff himself—should be in the air, but that, for the present, the C.-in-C. should remain in the battle line.

Incidentally, it seems not improbable that we shall see a parallel to this in the new Army. The reduction of the infantry arm and development of tanks and aircraft point to greatly increased mobility in land warfare. The result may be that headquarters can no longer remain stationary. The general directing the tactics of an army in battle may, it is suggested, find himself in a tank or an aeroplane.

Now, can Admiral Harper, or any other officer in the Grand Fleet, inform us why no senior staff officer was up in a seaplane trying to locate the enemy and pass accurate information to Lord Jellicoe ? It was left to a very gallant observer, who was an assistant-paymaster¹ in the Navy, to go up in the *Engadine's* machine. Right well he did his work. But in this huge fleet it seems almost incredible that no senior staff officer would take on air reconnaissance duties and feed his Commander-in-Chief by obtaining the most accurate information of the enemy's movements.

Surely Lord Jellicoe's task was difficult enough. Mr. Churchill, in his book, rightly points out the enormous responsibility resting on his shoulders,² and in all the accounts of Jutland I

¹ Assistant-Paymaster G. S. Tewin, R.N.

² Mr. Winston Churchill's phrase in connection with Lord Jellicoe was "the only man who could lose the War in an afternoon."

have read the outstanding feature is that Lord Jellicoe did not receive proper intelligence. Admiral Harper writes—¹

At Jutland, the main defect from first to last was the lack of intelligence reports, although there was a stream of messages passing, many of which were of secondary or no importance. There is, of course, a danger of the Fleet Flagship being swamped by a superabundance of reports, but her staff organization should provide for a system of "receiving or rejecting" to obviate congestion.

May I ask this simple question; Did not the young men on the Admiral's staff attach any importance to aerial reconnaissance or think it worth developing? If they did attach any importance to what intelligence aircraft could bring in, why didn't they have the *Campania* with the Fleet and go up in the machines?

I am quite aware we should have had more aircraft carriers for service with the Grand Fleet. Lord Graham,² the pioneer of aircraft carriers, put forward a proposal to build an aircraft carrier in 1913-14. I backed his proposal up strongly. But the "Sea Lords," in their great wisdom, turned down the first aircraft carrier proposed for the British Navy by Messrs. Beardmore's well-known, progressive and capable director.

The failure to appreciate the full value of rigid airships, aeroplanes, seaplanes, torpedo-carrying aircraft, and efficient aircraft carriers, by authority and certain other people, seems to me to have largely robbed Lord Jellicoe and my comrades in the North Sea from gathering the fruits of their victory.

(2) AIR ATTACKS ON ZEPPELINS

In a footnote dealing with the defence of London and anti-aircraft gunnery, "Neon" observes—

During the four years of war there were 51 airship and 52 aeroplane attacks over this country. London was bombarded 12 times by airships and 19 times by aeroplanes. The total number killed in Great Britain during the whole period was 1,413. In the four years 1922-25 inclusive the number killed in street accidents alone was 11,346.

¹ "Lessons of Jutland," *R.U.S.I. Journal*, 1927.

² Now Captain the Duke of Montrose, C.B., R.N.V.R.

What an extraordinary, warped brain-wave, to compare the deaths by air bombs in war time to street accidents in peace time! May I ask if the street accidents would not be ten or even a hundred times greater if it was not for our good, ever-watchful, and most efficient police force? Similarly, many more thousands of our countrymen would have been in grave danger had it not been for our watchful, efficient and gallant naval and military air pilots.

One of the many precautions we took is clearly outlined in the following telegram we sent early in September, 1914, to the French Ministry of Marine. It was drafted at Mr. Churchill's direction after a discussion on how we could best deal with the Zeppelin menace and after Mr. Sarell¹ had informed me that there was a small aerodrome at Dunkirk we might obtain from the French authorities—

The Admiralty consider it extremely important to deny the use of territory within a hundred miles of Dunkirk to German Zeppelins and to attack by aeroplanes all airships found replenishing there. With your permission the Admiralty wish to take all necessary measures to maintain aerial command of this region. The Admiralty propose therefore to place thirty or forty naval aeroplanes at Dunkirk or other convenient coast points. In order that these may have a good radius of action they must be able to establish temporary bases forty to fifty miles inland. The Admiralty desire to reinforce officers commanding aeroplanes with fifty or sixty armed motor-cars and two hundred to three hundred men. This small force will operate in conformity with the wishes of the French military authorities, but we hope it may be accorded a free initiative. The immunity of Portsmouth, Chatham, and London from dangerous aerial attack is clearly involved.

In carrying out these instructions from the First Lord, and as explained on page 181, I established a permanent air station at Dunkirk, and from there sent machines to Antwerp, which badly required them. One evening, early in October, 1914, Mr. Churchill sent for me, and said he wished me to accompany him on a visit to Dunkirk, and it would give me the opportunity of inspecting our air machines. We left London late in the

¹ See page 181.

evening, and our party consisted of Mr. Churchill, Admiral Horace Hood, and myself. We had gone about fifteen miles when the train was stopped and a message arrived that Lord Kitchener desired to see Mr. Churchill. We returned, and after his interview, Mr. Churchill informed me that Lord Kitchener required him to get all our armoured cars, the Marines, and every available man we could into Antwerp. On arriving at Dunkirk there was a good deal of hustle to be done to carry out Lord Kitchener's wishes.

Mr. Sarell, our able Vice-Consul, was very helpful to Admiral Hood and myself at this critical time, and on looking back I think we put up a pretty good show.

Our Marines and armoured cars were splendid in quickly getting into Antwerp, and they were followed soon after by the Naval Brigade.

On arrival at Antwerp, certain arrangements had to be made. Mr. Churchill, accompanied by Admiral Oliver,¹ Admiral Hood and myself, went to inspect the positions allotted to the Marines. The outskirts of Antwerp were then being shelled heavily by the Germans. Two Marines were badly wounded just outside the headquarters of the General commanding the Marines when we were inside. I think there is no doubt that the presence of some British forces did stiffen up the Belgian Army after the severe time they had gone through, and caused the delay in the evacuation of Antwerp, which was what Lord Kitchener desired.

The tale of Antwerp has been told by many, but I have never seen it confirmed that Mr. Churchill's train was stopped, when he was desired by Lord Kitchener to put every man he could lay his hands upon into Antwerp. When we set out on our journey, Mr. Churchill had no more idea that we would be diverted to Antwerp than Admiral Hood² or I had. At that time Hood was rather seedy, and had he known I do not think

¹ Admiral Oliver was then in Antwerp on a special mission.

² The late Admiral Horace Hood, who was then Naval Secretary to the First Lord.

he would have undertaken the rush we had in getting our men into Antwerp ; it almost knocked him out. On one or two occasions I had the greatest difficulty in getting him to keep going. Poor Hood was a splendid comrade, and I was always glad that I was able to render him some little service during this very difficult time at Dunkirk and Antwerp.

Both Lord Kitchener and Mr. Churchill knew perfectly well the Naval Division that we hastened to Antwerp at that time was not too well trained. But in times of emergency diversions may be of great value and cause the delay that may have been vital in another theatre of the War.

I recall that a high tribute was paid to the services of the Naval Brigade when Sir Cecil Hertslet (late H.M. Consul-General for Belgium), lecturing to the members of Exeter Library Society on "The Fall and Recovery of Antwerp" in 1921, gave an interesting personal narrative of the events of that time.

Sir Cecil, who was the last to leave Antwerp when it was evacuated, and the first Englishman to return after the Armistice, said the Government had been severely criticized for sending the Naval Brigade to the city, but by delaying the evacuation for six days they did an immense thing. Had no British troops been sent, the Belgian Army, which was thoroughly disheartened, would have been so broken that they would never again have been able to offer a resistance to the enemy.

My machines were all ready to fly to Dusseldorf and Cologne before Antwerp fell, so, with Mr. Churchill's approval, off they went in the afternoon of the 8th October, 1914, just as the German shell fire on the aerodrome was becoming severe. Squadron-Commander Grey made a gallant attempt to find the Zeppelin airship sheds at Cologne, but could not locate them on account of the haze. So he dropped his bombs on the railway station and inflicted some damage. The attack on the Dusseldorf airship shed by Flight-Lieutenant Marix was a most skilful operation. This officer dropped two 20-lb. Hales

bombs on this shed. The destruction was complete. The roof fell in within 30 seconds, and the flames rose to 500 ft., showing that a Zeppelin fully inflated with hydrogen gas was inside.

This Zeppelin was the newest the Germans had, and her destruction caused considerable consternation in Germany, as they did not believe such a raid was possible by a British aviator. In addition to the Zeppelin and shed being destroyed, a machinery shop adjacent to the airship was badly damaged. This damage was confirmed by intelligence reports and private letters.

Lieutenant Marix, whilst making his attack, was under a heavy rifle and shell fire, and his machine was holed in many places. In spite of this, he managed to fly back to within 20 miles of Antwerp, when his petrol ran out and he was compelled to make a forced landing. He borrowed a bicycle from a peasant, hoping to send out an armoured car to rescue his machine. But when he arrived at Antwerp the order to evacuate had been given and the machine had to be left.

Both Spencer-Grey and Marix were fine pilots, and they deserve great credit for their long flights into Germany. Marix was the first airman to destroy a Zeppelin in her shed in the War. My Reader will recognize this as a fine feat for a lone airman.

In December, 1914, I obtained from Mr. Churchill permission to send some seaplanes into the Heligoland Bight, to ascertain the whereabouts of the German Fleet, and also to drop bombs on points of military importance.

The Chief of Staff kindly allowed me to get into direct touch with Commodore Tyrwhitt, in command of the light cruisers, and Commodore Keyes, in command of all the submarines, to arrange matters. Commodore Tyrwhitt, with a force of light cruisers, escorted the seaplane carriers *Engadine*, *Riviera*, and *Empress*, under the orders of a very skilled airman, Squadron-Commander L'Estrange Malone,¹ to their destinations.

Seven machines soon got off the water and went on their

¹ Now Member of Parliament for Northampton.

mission. I arranged with the Commodore (S.)¹ to have submarines ready to pick up the machines at different points. This reconnaissance was most complete. The seven machines flew over Cuxhaven and right round the Heligoland Bight and brought in information with regard to the enemy's battleships, cruisers, destroyers, auxiliary ships being in the Schellig Roads.

It was reported that the cruiser *Von der Tann* was damaged in this air raid and had to be replaced by another cruiser ; also a destroyer, " G 170," was believed to have been hit. Other damage was reported to have been done to some colliers, the quay at Cuxhaven, and an airship shed, but I doubt if the latter was hit.

In accordance with plan, some of the machines were picked up by destroyers and submarines.

One of our submarines had a lively time. She picked up three pilots, and in doing so was attacked by a German Zeppelin, which dropped bombs all round the submarine. Lieutenant Nasmyth² was most courageous, and would not abandon the pilots until he had rescued all three and their observers. A great deed this, and worthy of the high traditions of our splendid submarine service.

Six out of the seven pilots and their observers were rescued by the destroyers and submarines. Flight-Lieutenant Hewlett was missing. He was rescued by a Dutch trawler, the *Maria van Hattem*, who took him with their cargo of fish to Ymuiden, where he was shown every kindness by the British Vice-Consul and official authorities in Holland, and after a little time reached this country without further mishap.

In addition to Flight-Commander Hewlett, the following pilots took part in this historic flight: Flight-Commanders Ross, Oliver, Kilner, Flight-Lieutenants Miley, Edmonds, and Flight-Sub-Lieutenant Gaskell-Blackburn, with their gallant observers, one of whom was a brave man, who always sent in splendid reconnaissance reports, Lieutenant Erskine Childers,

¹ Then Commodore Keyes ; now Admiral Sir Roger Keyes, K.C.B.

² Now Rear-Admiral Martin Nasmyth, V.C., R.N.

the author of the *Riddle of the Sands*, who came to such an unfortunate end in the troublesome days in Ireland just after the War. I always found Erskine Childers a most knowledgeable person and ready to take any risk on service. His unfortunate end was a blow to all of us, as he had undoubtedly helped to build up the traditions of our Air Service.

In his report of this air reconnaissance of the Heligoland Bight, Commodore Tyrwhitt remarked—

The morning, although fine, was bitterly cold, and I consider these officers, who carried out a 120-mile flight, deserve the highest credit and gave a magnificent exhibition of British pluck, daring, and endurance.

High praise this to our naval airmen from one of the most gallant and capable flag officers in the Navy.

This was the first time in history that aircraft had been used in combination with surface and submarine vessels, and the operation was carried out on Christmas Day, 1914.

After this attack, the Admiralty sent me the following Minute—

I am to convey to you an expression of their Lordships' appreciation of the skilful arrangements made for the air reconnaissance of the Heligoland Bight and attack on military points at Cuxhaven on the 25th December, and of the success with which that reconnaissance and attack were carried out.

Their Lordships regard the work of the seaplane carriers and seaplanes in assisting to bring this novel and dangerous enterprise to a successful issue as having been exceptionally good.¹

In accordance with the general instructions given to me to attack the Zeppelin sheds, I obtained approval from Mr. Churchill to send a flight of aeroplanes to attack the Zeppelin sheds at Friedrichshafen, on Lake Constance.

Very valuable information of a secret nature was obtained for me at much personal risk by a gallant Canadian officer, Colonel Grant Morden²; also Lieutenant Pemberton-Billing³

¹ 6th January, 1915.

² Now Member of Parliament for Brentford and Chiswick.

³ Late Member of Parliament for E. Herts.

followed this up, and procured for me the necessary data for drawing up instructions for this operation.

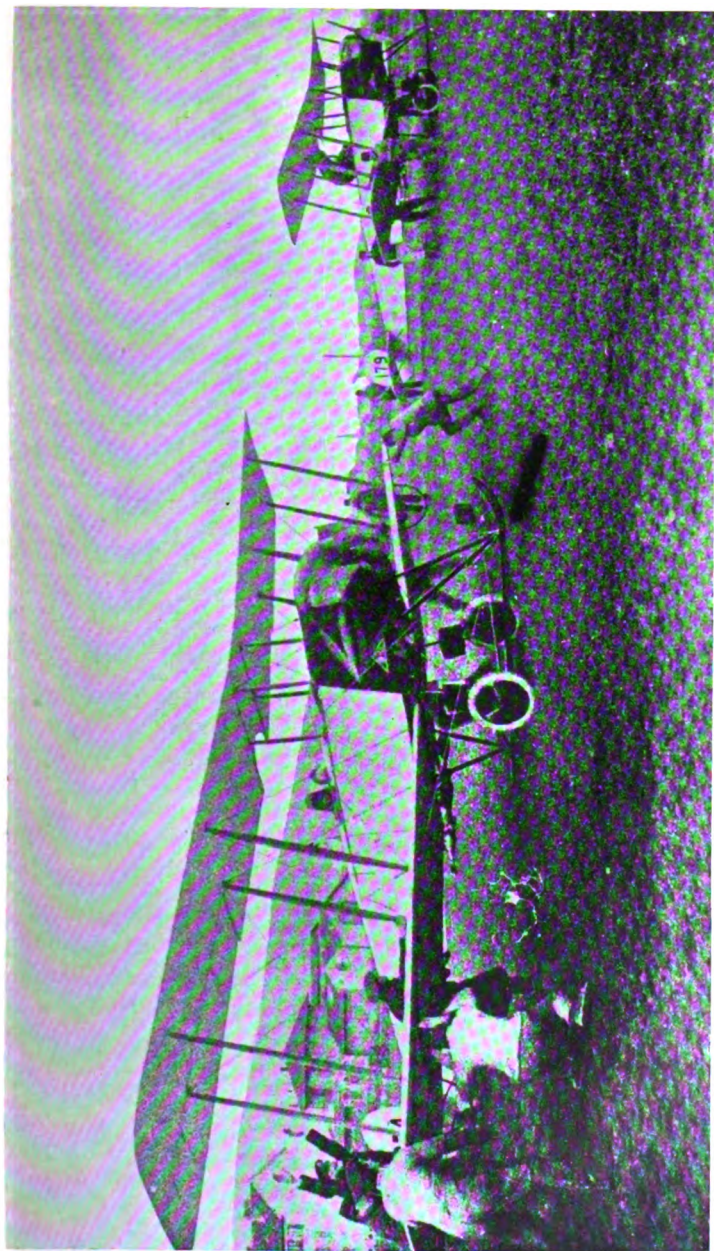
As I wanted to relieve the naval pilots from anxiety, I placed Lieutenant Pemberton-Billing in charge of all the details in connection with transporting the machines from this country to Belfort. Whatever Pemberton-Billing's shortcomings may have been as a politician, he was a fine organizer and capable man in arranging an operation of this nature. He carried out the instructions given to him to the letter. The machines had to be carefully packed, at the works of Mr. A. V. Roe, and sent to Belfort, where the French authorities gave every possible assistance in preparing for this raid. In his official report, Pemberton-Billing concealed the part he played. But I place it on record that the Naval Air Service owes much to this officer for his valuable help in his intelligence work before the attack, and for the attention he gave to every detail of transport work to enable the pilots to achieve their success. Our thanks are also due to A. V. Roe for the good supervision and fine workmanship put into these machines. When unpacked they were correct to the smallest item. (Plate 2.)

The Secretary of the Admiralty communicated the following description of this attack—

On Saturday¹ a flight of aeroplanes under the command of Squadron-Commander E. F. Briggs of the Royal Naval Air Service, with Flight-Commander J. T. Babington and Flight-Lieutenant S. V. Sippe as pilots flew from French territory to the Zeppelin airship factory at Friedrichshafen. All three pilots in succession flew down to close range under a heavy fire from guns, mitrailleuses and rifles, and launched their bombs according to instructions. Commander Briggs is reported to have been shot down wounded and taken to hospital as a prisoner. Both the other officers have returned safely to French territory, though their machines were damaged by gun fire.

They reported positively that all their bombs reached their objectives, and that serious damage was done to the Zeppelin factory. This flight of 250 miles, which penetrated 120 miles into Germany across mountainous country in difficult weather conditions, constitutes with the attack a fine feat of arms.

¹ 21st November, 1914.



"AVROS" STARTING FROM BELFORT FOR ATTACK ON FRIEDRICHSHAFEN, 21ST NOVEMBER, 1914

A Swiss engineer reported that the latest Dreadnought Zeppelin was very seriously damaged, and he, as an eye-witness, counted nine bombs which fell in an area of 700 square yards round the Zeppelin works and sheds, and did considerable damage. I thought this was a very fine exploit, and reflected not only high credit on the gallant pilots, but also on Lieutenant Pemberton-Billing and his staff, who contributed so much before and in general assistance to make this operation a success.

Captain Morris, in his excellent book, *The German Air Raids*, describes our Friedrichschafen operations as "masterly in conception and superb in execution."

It is refreshing to read that something the Royal Naval Air Service did should receive such high commendation from such an able historian.

After the Friedrichschafen air attack, I issued the following to the officers and men of the Royal Naval Air Service, dated 25th November, 1914—

Lord Fisher desires me to express to all concerned his high appreciation of the service rendered both by the officers who carried out the recent daring raid on Lake Constance and also by the officers of the Air Service in general.

He considers that the flight mentioned, made over 250 miles of enemy country of the worst description, is a fine feat of endurance, courage and skill, and reflects great credit on the officers who took part in the raid, and through them on the Air Service to which they belong.

and I have a note which is an extract from a letter to the then First Lord,¹ that I was instructed to circulate to all naval air stations and seaplane carriers—

Will you kindly convey to Naval Air Wing the warm congratulations of the Field Army in France on their splendid raids into Germany?

Early in the morning of 7th June,² Flight-Sub-Lieutenant Warneford was detailed by the Commanding Officer of Dunkirk

¹ Mr. Winston Churchill. ² 1915.

to bomb the Zeppelin sheds at Berchen St. Agathe. Soon after leaving the aerodrome, he sighted a Zeppelin, and at 3 a.m. intercepted the "LZ 37" and proceeded to attack her in the following manner: Climbing to 6,000 ft. to get above the airship, he dived close to her and flattened out, then dropped six Hales bombs on her. The airship exploded, fell to the ground and burnt for a considerable time. The force of the explosion caused Warneford's Morane machine to turn upside down. But he succeeded in righting the machine, and then had to make a forced landing in enemy's country. However, he was able to re-start his engine and returned to the aerodrome little the worse for his adventure.

The day after Warneford destroyed this German airship His Majesty the King sent him the following telegram—

I most heartily congratulate you upon your splendid achievement of yesterday, in which you, single-handed, destroyed an enemy Zeppelin. I have much pleasure in conferring upon you the Victoria Cross for this gallant act.

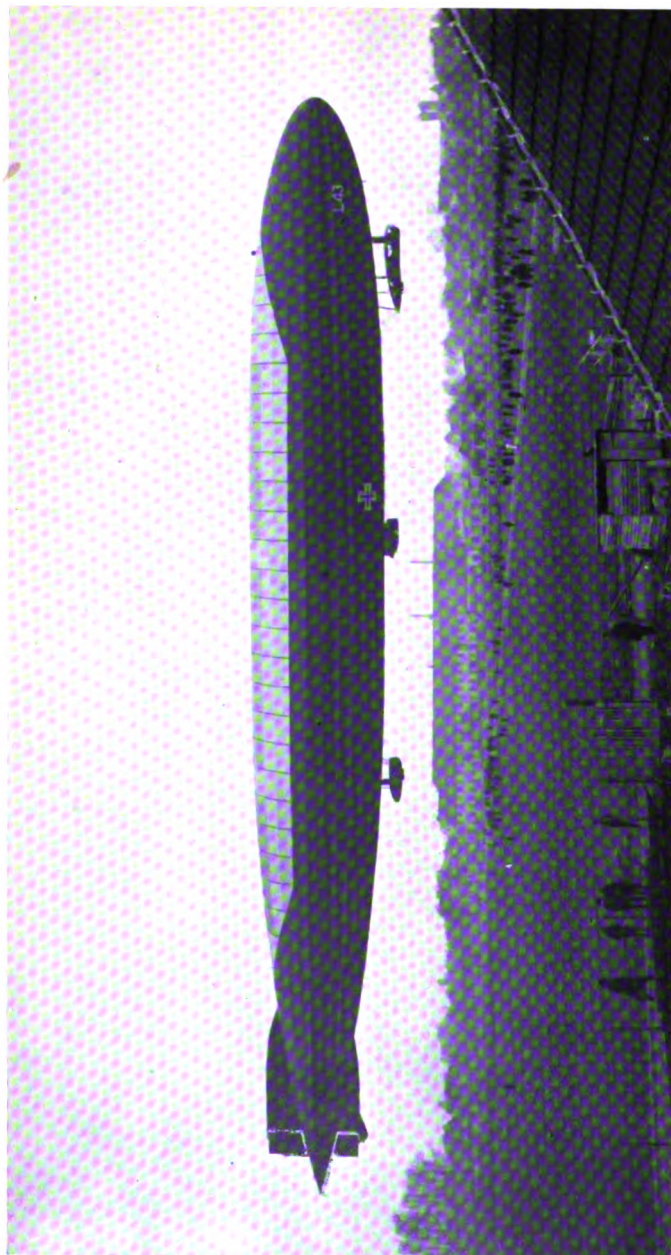
Four days later Warneford received the Cross of Chevalier of the Legion of Honour, as a mark of the great appreciation of the French nation for his brilliant exploit.

Poor Warneford did not long enjoy the great honours bestowed upon him, for in testing a new machine at Buc Aerodrome, near Versailles, with a passenger, Mr. Blake Needham, an American journalist, on Thursday, 17th June, 1915, he lost his life, and as Warneford is not now with us, it is not out of place that his old chief should challenge Mr. Pollen by asking if Warneford's and Marix's great deeds in leading the way to smash up the Zeppelin menace to this country were not a direct contribution to victory?

ACHIEVEMENT¹

Above the huge leviathan, and kept
Full speed above her, where our baffled foes
Could get no chance to use machine-gun fire;

¹ In memoriam to Flight-Sub-Lieutenant Warneford, V.C., R.N.A.S., by the late Francis Beaumont Cottier, in *Poems*, 1927.



L 43, WHICH WAS SHOT DOWN BY AN H.I2 FLYING BOAT FROM THE ROYAL NAVAL AIR STATION, FELIXSTOWE, 14TH JUNE, 1917, BY FLIGHT SUB-LIEUTENANT B. D. HOBBS, D.S.C., AND FLIGHT SUB-LIEUTENANT R. F. L. DICKEY, D.S.C. CREW : A/MS. H. M. DAVIS AND GOODY

(By courtesy of "Air," the *Journal of the Air League of the British Empire*)

Then dropped to just within one hundred feet
Of that infernal target of God's ire.
With pent-up vengeance burning at white heat
For all their monstrous cruelties, I hurled
Five bombs in quick succession at the mark ;
The sixth bomb burst the envelope ; the world
Seemed at an end. Flames licked the doomed barque
Swiftly from side to side, and caught the tank—
A loud explosion followed. Wrecked and rent
The fated Zeppelin overturned and sank,
Like a spent star from out the firmament.
Tossed upwards by the swift explosion's power
My aeroplane was hurtled upside down.
I " looped the loop," and in that fateful hour
By a strange miracle God's love did crown
Th' adventurer's life ; for like some faery elf,
That rules the borderland 'twixt tears and mirth,
My faithful argosy righted itself,
And landed me, 'tis true, on alien earth.
I filled the petrol tank, set engines right,
The angry foemen burning to give chase ;
Then like the fabled albatross in flight
We soared the blue abyss, and won the race.
Shells burst around ; a fierce tornado swept
The circumambient air ; scatheless we rose.

The same morning¹ as Warneford destroyed his Zeppelin, Flight-Lieutenant S. P. Wilson, and Flight-Lieutenant S. S. Mills, gallantly attacked the airship station at Evere, North of Brussels. They successfully dropped 20 lb. Hales bombs on the shed. The bombs detonated, with the result that almost immediately flames reached a height of five or six hundred feet, and also were seen coming out of the sides. This showed a Zeppelin was destroyed in the shed. Her number was " L 38." The shed was completely gutted, and a Belgian deputy computed the damage, as is recorded in official papers, at 5,000,000 marks. A sister ship, " L 43," is shown in Plate 3.

I had been up most of the night with Commander Groves and other officers of the anti-aircraft staff on top of the

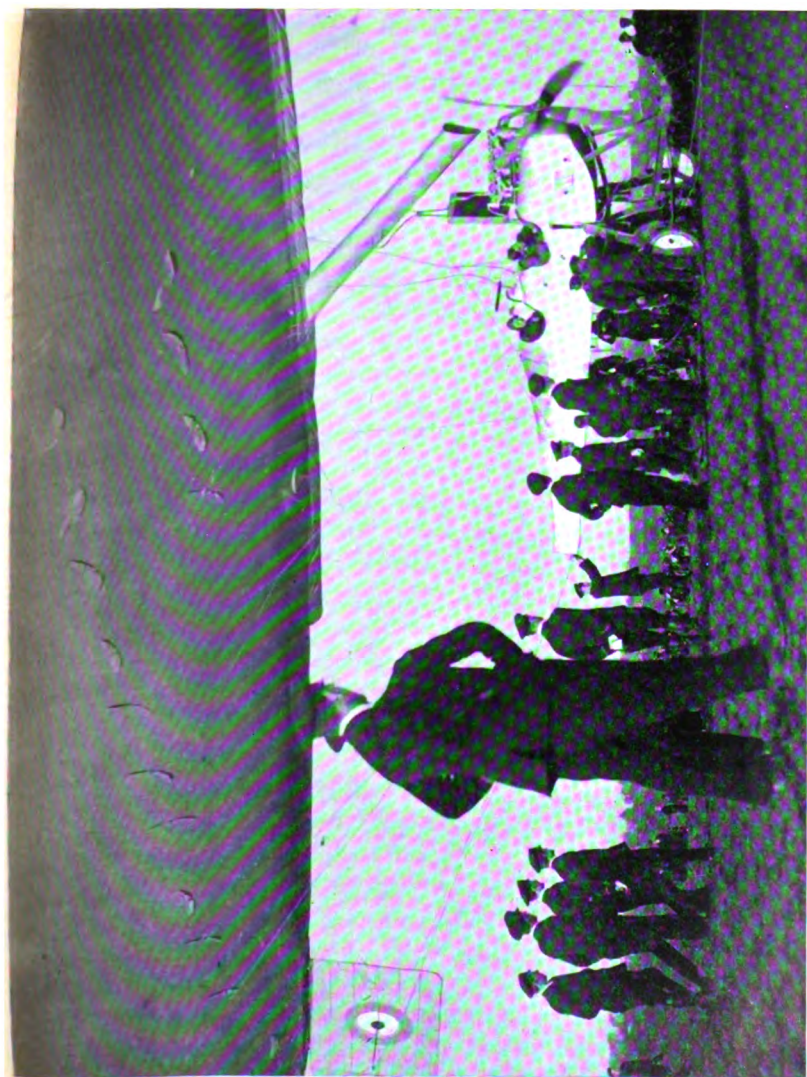
¹ 7th June, 1915.

Admiralty Arch, waiting for a Zeppelin attack on London that did not mature, as the airships did not come so far, owing to fog, so I was a little weary, and about 10.30 a.m., just after I had perused the reports of my airmen's two successful attacks on the Zeppelins, I received this message: "Will you attend in the — Sea Lord's room." I snatched up the Zeppelin reports, and went to find three Sea Lords in the room, and wondered what fault the poor old Air Service had now committed. — Sea Lord started: "Is it true that the sub-lieutenants who have been detailed for training with the S.S. airships go to music halls at night?" My reply was: "I do not know, Sir. That is not my work. It is for the Commanding Officer of the Air Station to deal with, not me." Then, in a very severe voice, "I am informed these young officers *do* go to music halls at night." (Plate 4.)

I replied, "That may be, Sir, but it is not my work," and, having the greatest difficulty in refraining from laughing, said: "This is more my work, Sir. I have been up most of the night, because we were warned that there would be a Zeppelin raid, and my airmen on the Dunkirk side have destroyed two Zeppelins before breakfast, and I want to report what they have done to the First Lord, as he will be most interested, so may I be excused, Sir, please?"

To my dying day I shall never forget the look on the faces of the three Sea Lords, who were pin-pricking their own Air Service. It remains with me a memory of one of the incidents in the battle between certain airmen and the NoaHS that became so acute after Mr. Churchill left the Admiralty. One of the Sea Lords soon recovered. He was a man I very much admired as a clever gunnery expert and good Controller of the Navy. He was merely going with the tide against the airmen, and jumped up from his seat extending his hand, and said, "I congratulate you most warmly, D.A.D., and convey the same to your fine airmen." "Thank you, Sir," and I withdrew.

I relate this incident to bring out the following point. Collectively, the Sea Lords could criticize any gunnery, torpedo,



SOME OF THE NAUGHTY NAVAL SUB-LIEUTENANTS WHO ARE BELIEVED TO HAVE GONE TO
MUSIC HALLS AT NIGHT AFTER RECEIVING INSTRUCTION IN FLYING S.S. AIRSHIPS

Under supervision of Commander Masterman, R.N., in foreground, 1915

navigation, seamanship, strategic or tactical matter connected with the Navy from the most expert point of view, and their dictum on these subjects would always be of the highest value. But they found themselves quite at sea over air matters, and quite unable to criticize air papers on the technical side. When they attempted to do so, they came to grief badly. But the Air Service had to be found fault with ! Consequently, all criticism descended into "piffle" which made the airman laugh. But it had a most serious side, which I did my best to combat by treating the matter lightly, and that was, it was so bad for discipline to have papers circulated in the Air Department with rather unwise minutes placed on the dockets. In many cases I concealed the papers until the matter had been forgotten. Some of the men who came into the Air Service to help us during the War were quite elderly. Many were University men and drawn from very good positions in the City and private life. They resented being told, when we wanted to shift the Air Service garage nearer to Whitehall, that the real reason was "not to save time" but the "proximity to music halls was the advantage." Some of these officers openly said "their music hall days started and finished about the same time as the Sea Lords," and they resented most strongly such insinuations being circulated round the Admiralty Office when they had joined up to help in the War !

On the 9th August, we 'phoned from Anti-aircraft, London, to Dunkirk to look out for a damaged Zeppelin that had been injured by the anti-aircraft defences of Dover.

Flight-Commander Smyth-Pigott, on a B.E. 2 C. was the first to find this Zeppelin, soon after 8 a.m. He bombed her, and succeeded in breaking her back. This was the "L 12."

Flight-Sub-Lieutenants Besson and Bettington, on Bristol Scouts, joined in the attack, and were then assisted by Flight-Sub-Lieutenant Bush on another B.E. 2 C. and Flight-Sub-Lieutenant Leslie on a Henri Farman in bombing the Zeppelin. Flight-Lieutenant Buss, on an Avro, completed her destruction. The debris was towed on shore at Ostend by four German

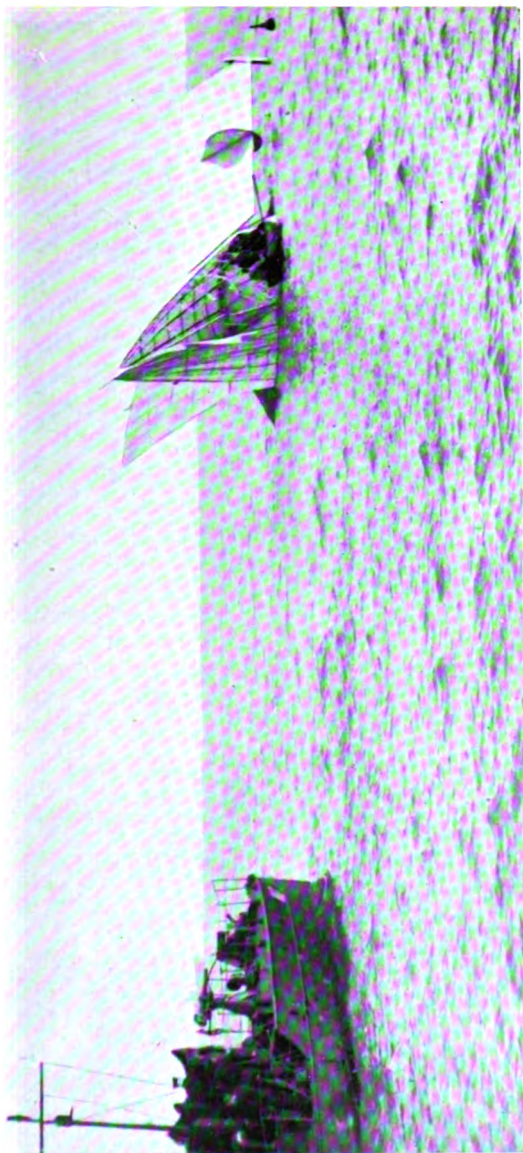
torpedo boats and all available parts were sent back to Germany. This was a most gallant attack, led by Smyth-Pigott. All our machines were under heavy gunfire and the weather was so thick that flying at times was most difficult.

I am naturally not so familiar with the attacks on Zeppelins made by our military colleagues, but I have a note that on the 31st March, 1916, at 9.40 p.m., the guns at Purfleet, Abbey Wood, Erith, Southern Outfall, Plumstead Common and Plumstead Marsh opened a heavy fire on a German Zeppelin, the "L 15." The airship, in attempting to elude this heavy bombardment, turned northward, and attempted to drop bombs on Rainham. These did no damage. Twenty explosive and twenty-four incendiary bombs were found in the open fields near by. Just as the "L 15" was crossing the Rainham-Warrington road, at 9.45 p.m., she was hit by a shrapnell shell from Purfleet, which made a large rent in her side, damaging three gas-bags. She was then attacked in a most gallant way by Second-Lieutenant Brandon, flying a B.E. 2 C. He dropped incendiary darts upon the airship, and was under a heavy machine-gun fire whilst making his attack. The "L 15," burning slightly, fell into the sea off the Kentish Knoll and became a total wreck (Plate 5). This photo was taken by Commander Dane, R.N., and he very kindly sent me a copy.

There can be little doubt that on the night of the 23rd September, 1916, "L 33" had one of her propellers badly damaged over the East End of London by one of our anti-aircraft guns. She was also attacked by that fine pilot Second-Lieutenant Brandon, on a B.E. 2 C. machine. This time he fired into the airship Brock and Pomery ammunition, and finally she came down at Little Wigborough and was partly burned. The crew were taken prisoners. Plate 6 is interesting.

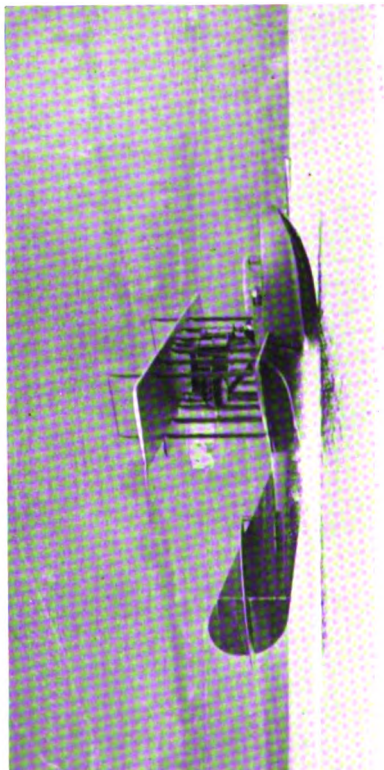
Second-Lieutenant Tempest, in a most gallant attack, destroyed "L 31" on 1st October, 1916, by means of ammunition fired from a Lewis gun. He discarded all other means of attacking the Zeppelin so that he could climb to a greater altitude. He sent "L 31" down in flames at 12,700 ft. near

PLATE 5



THE LAST OF "L 15," SINKING OFF KENTISH KNOCK, 31ST MARCH, 1916

PLATE 8



THE LATE MR. RODMAN WANAMAKER'S "AMERICA," FIRST
BOAT-TYPE TRANSATLANTIC SEAPLANE, 1914

Potters Bar, and was severely hauled over the coals for not using Le Prieur rockets ! I do not suppose this perturbed such a fine flyer, as he was awarded a D.S.O. for his good effort on a B.E. 2 C. (Plate 7).

On the 27th November, 1916, Second-Lieutenant I. S. Pigott, on a B.E. 2 C. sighted a Zeppelin, "L 39," between Sunderland and Hartlepool, when at 9,800 ft. This gallant pilot attacked the Zeppelin from underneath, firing into her port quarter.

A small patch first became incandescent, then the whole Zeppelin was in flames and she fell into the sea at the mouth of the Tees.

On a B.E. 2 C. Flight-Sub-Lieutenant Pulling got within 60 ft. of a Zeppelin, "L 21," when at an altitude of 8,200 ft. on 28th November, 1916. As he approached to attack he was under a constant fire from machine-guns. After firing a few rounds into the airship she was in flames and the aeroplane, to avoid the debris, had to swerve on one side. As the Zeppelin fell into the sea off Lowestoft, the gallant German crew continued to fire at the aeroplane.

Two other officers, Flight-Lieutenant Cadbury and Flight-Sub-Lieutenant Fane, took part in this attack, and no doubt contributed in no small way to Pulling's success.

Before the War, I obtained approval to purchase a Donnet L'Evêque flying boat, and ordered some flying boats from that enterprising and skilful constructor, Mr. Tom Sopwith. All these machines did useful work.

Just after hostilities commenced, Commander Porte came to me, having crossed at once from America, and said Mr. Wanamaker, who was financing the boat type seaplanes being built by Mr. Glen Curtis for the first Atlantic flight, placed them at the disposal of the Admiralty. I obtained approval to purchase two of these machines that Mr. Wanamaker¹ so kindly said we could have (Plate 8).

With our former knowledge of boat-type seaplanes, we

¹ The late Mr. Rodman Wanamaker.

gradually built up at Felixstowe a little fleet of flying boats that did good service in the War. The late Commander Porte wore himself out at this work. His staff were splendid, and they must have felt well rewarded, as the following few instances will show.

The "L 22" Zeppelin was brought down on 14th May, 1917, off Terschelling Light Vessel, in a gallant fight by Flight-Lieutenant Galpin and Flight-Sub-Lieutenant Leckie, with crew, in a large flying boat, "H 12," based on the Royal Naval Air Station at Yarmouth.

The flying boat at 6,000 ft. sighted the Zeppelin some fifteen miles off, then at about 3,000 ft. The boat dived at the Zeppelin, and the big airship put her nose up to climb. The flying boat missed her, came up under the starboard quarter, and emptied several complete trays of incendiary bullets into her at ranges from 50 to 100 yards. Within some twenty seconds the airship was completely alight, and the whole structure fell into the water. The damage by gun fire to the flying boat was small. Officers and crew deserve the highest praise for their gallant action. This is the first occasion in history that a seaplane of the flying-boat type brought down a Zeppelin.

Zeppelin "L 43" was shot down by another flying boat, "H 12," on 14th June, 1917, commanded by Flight-Sub-Lieutenant Hobbs and Flight-Sub-Lieutenant Dickey, off the Dutch coast, near Vlieland. The Zeppelin was at an altitude of 1,500 ft. when the "H 12" sighted her when at 3,000 ft. The airship being about five miles off, on closing the flying boat dived for the Zeppelin tail and emptied some trays of Brock and Pomeroy tracer bullets into her. She flamed up at once and went headlong into the sea. This was a gallant exploit for two Flight-Sub-Lieutenants. Plate 3 is "L 43."

When that intrepid airman Lieutenant Leefe Robinson, flying a B.E. 2 C., brought down the "SL 11"¹ at Cuffley in flames, on the 3rd September, 1916, I was one of the first to

¹ Schutte Lanz type of airship.

congratulate him, as it was then my duty to inspect and give a technical report¹ on all airships brought down.

Lieutenant Sowrey, also flying a B.E. 2 C. machine, gallantly brought down the "L 32" in flames on 24th September, 1916, at Billericay. All these successful B.E. 2 C. aeroplanes were designed and built at the Royal Aircraft Establishment, Farnborough.

Commander Samson was the first to fly an aeroplane off the deck of the battleship *Africa*, in December, 1911, and I had a whole series of experiments carried out at Grain Island, with special guiding apparatus, to ascertain the best method of flying off the deck of a carrier. Then we carried out practical trials from the seaplane carrier *Vindex*. This was useful preliminary work, and on 21st August, 1917, Flight-Sub-Lieutenant Smart, in a "Sopwith Pup," flew from H.M.S. *Yarmouth* and attacked the "L 23" off Lodberg. This gallant young officer climbed to 9,000 ft., got above the Zeppelin, and dived for her tail, flattened out, and succeeded with gun fire and tracer bullets in sending the Zeppelin in flames into the sea. This attack and that on "L 43" showed how efficient our young officers were becoming.

Lieutenant Pyott made a fine attack on the "L 34" and brought her down in flames in the sea off Hartlepool on the 27th November, 1916. This pilot secured his success on a B.E. 2 C. machine.

Another B.E. 2 C. Farnborough machine was successful in the skilled hands of Lieutenant Watkins in bringing down the "L 48" in flames off Harwich, on 17th June, 1917.

Then the Royal Naval Air Service and Royal Flying Corps fortunately amalgamated, and on the 10th May, 1918, "L 62" was destroyed by a flying boat, "F 2A," off Heligoland, by Captain Patterson, Captain Munday, and crew. The Zeppelin climbed to 9,000 ft. When the flying boat was at 8,000 ft. fire was opened on the Zeppelin; she then climbed to 12,500 ft., being closely pursued by the flying boat, which was under heavy

¹ All the details in connection with the design and construction of these German rigid airships were collected and compiled into a most valuable book by Captain Sir Malcolm Fraser, R.N.V.R., afterwards Chief Agent of the Conservative Party.

fire whilst chasing her. This Zeppelin was severely damaged in this fine fight, and went into the sea off Heligoland in flames.

Two attacks were made on the Zeppelin sheds at Tondern by Sopwith "Camels" flown from the deck of H.M.S. *Furious*, on 19th July, 1918. These machines were piloted by Captain Jackson and Captain Dickson in the first attack, and in the second by Captain Smart, Captain Thyne, Lieutenant Dawson, and Lieutenant Yeulett, all of the Royal Air Force. This was a gallant effort to wipe out the few remaining Zeppelins, and it is believed "L 54" and "L 60" were destroyed.

A successful Zeppelin attack was made by a D.H. 4, from Yarmouth Seaplane Station, on the 5th August, 1918, piloted by Major Cadbury and Captain Leckie as observer, in which "L 70" was destroyed by machine-gun fire and fell in the sea off Wells in flames.

To Lieutenant S. D. Culley, flying a Sopwith "Camel" from a lighter towed by a destroyer, falls the honour of destroying the last Zeppelin of the War. He attacked the "L 53" on 11th August, 1918, with machine-gun fire, and brought her down in flames off Ameland.

From my figures, I make out the airmen helped to destroy or destroyed twenty-one airships, allocated as follows—

R.N.A.S.	.	.	.	.	.	.	9
R.F.C.	.	.	.	.	.	.	7
R.A.F.	{ on amalgamation of the two R.N.A.S. and R.F.C }						5

The machines that were used in the destruction or part destruction of these twenty-one Zeppelins are of interest—

B.E. 2 C.'s.	.	.	.	.	.	9
Sopwiths	.	.	.	.	.	5
Felixstowe Flying Boats	.	.	.	.	.	3
D.H. 4	.	.	.	.	.	1
Avro	.	.	.	.	.	1
Morane	.	.	.	.	.	1
Farman	.	.	.	.	.	1
Total	.	.	.	.	.	<u>21</u>

This table shows how wonderfully well Colonel O'Gorman's B.E. 2 C. aeroplanes, built at the Royal Aircraft Establishment, Farnborough, and Sopwith machines, did in helping to defeat the Zeppelin menace.

In addition to the few incidents I have related, the pilots of the Royal Naval Air Service were of value to the French Army in the early days of the War, as the following letters that I was instructed to circulate show—

FRENCH EMBASSY.
NAVAL ATTACHÉ.

LONDON,
5th July, 1915.

DEAR SIR GRAHAM,

I beg to ask you to convey to the Lords of the Admiralty the enclosed letter giving General Foch's appreciation of the splendid work of the British Naval Air Service in France.

Yours faithfully,
(Signed) SAINT SEINE.

GROUPE DES ARMÉES
DU NORD.

P.C. le 21 Juin, 1915.

ETAT-MAJOR.

LE GÉNÉRAL FOCH
Commandant le Groupe des Armées du Nord
à Son Excellence le Premier Lord de l'Amirauté,
Whitehall,
LONDON, S.W.

Depuis les débuts de la campagne, une escadrille d'aviation maritime Anglaise est stationnée à St. Pol-sur-Mer. Commandée successivement par le Commandant Samson, puis par le Commandant Longmore, elle a toujours prêté son concours aux aviateurs français pour l'accomplissement de la tâche commune, sollicitant même les missions les plus périlleuses.

Le Général Foch est très heureux d'adresser à tout le personnel de l'escadrille ses remerciements pour cette collaboration ; il le félicite chaudement des exploits qu'il a mis à son actif, dès autant à son initiative qu'à son audace.

Le Général Foch serait très reconnaissant à Son Excellence le Premier Lord de l'Amirauté de bien vouloir transmettre ses félicitations aux intéressés.

(Signed) J. FOCH.

ADMIRALTY,
S.W.

M. 05201.

DEAR COMTE DE SAINT SEINE,

I have laid before the Board of Admiralty your letter transmitting a letter from General Foch, relative to the work of the British Naval Air Service in France, and I beg you will inform General Foch that they have read with the utmost pleasure his warm expressions of approbation. They are happy to think that the officers and men under their command have been able to be of value to the French Army.

Believe me,

Yours sincerely,

(Signed) W. GRAHAM GREENE.

Also quite an independent body, the Navy League, passed a resolution on the 24th February, 1915, which their very capable secretary, Mr. P. Hannon,¹ forwarded to me, in the following terms—

That the Grand Council of the Navy League offer their heartiest congratulations and grateful thanks to the Commodore and Royal Air Service men for their splendid achievements in the War.

After Samson and Longmore had been in command of the Royal Naval Air Service units at Dunkirk, the work was taken over by Commander Lambe,² a well-known naval torpedoist, and, writing³ in August, 1917, he points out the serious effects on the force under his command of the wastage of pilots, but concludes: "I would remark, however, that the loan of these squadrons to the Royal Flying Corps must have been of the greatest value to the Empire, since the official record issued by the Royal Flying Corps states that up to August, 1917, a hundred and twenty-one enemy machines have been destroyed by naval squadrons and two hundred and forty have been driven down out of control."

At Lord Weir's kindly dinner to the seventy surviving officers of the squadrons of the R.N.A.S. and R.F.C. which went

¹ Mr. P. Hannon, M.P. for Moseley.

² Now Air Vice-Marshal Lambe, C.B., C.M.G., D.S.O.

³ Extract from *The War in the Air*, by Sir Walter Raleigh, page 479.

overseas in August, 1914, on 1st February, 1919, at the Savoy Hotel, Mr. Churchill paid a tribute to the Royal Flying Corps in the pioneer work it had done, and with regard to Royal Naval Air Service, remarked that when the Army went away and left this country unprotected, they were the one weapon that prevented Zeppelins coming in broad daylight and dropping bombs on our arsenals, magazines, and naval centres.

And in his book he wrote—¹

All honour to the naval airmen, the pioneers of the aerial offensive, who planned and executed in these early months the desperate flights over hostile territory in an element scarcely known, which resulted in the raids on Dusseldorf and Cologne on the Rhine, Friedrichshafen on Lake Constance and Cuxhaven in the Heligoland Bight.

Altogether, in the first twelve months of the War, six Zeppelins were destroyed in the air or in their sheds by the offensive action of a handful of British naval airmen.

But, Reader, Mr. Pollen says the airmen's contribution to "Victory" is pretty hard to find. I beg to claim that these gallant naval and military airmen, operating over our own country, in Belgium, and many parts of the North Sea, succeeded in successfully combating the Zeppelin menace, and, by doing so, spared many thousands of their countrymen, women, and children from the gravest peril to life and limb, and also prevented our chief naval ports, large cities, and arsenals from being much damaged, had these enemy aircraft been allowed to roam in large numbers over our country unmolested.

(3) AIR ATTACK ON SUBMARINES

SHOULD SUBMARINES BE ABOLISHED ?

Perhaps a word on submarines being attacked by aircraft would not be quite out of place. Colonel Repington reminds us of a conversation he had with an Admiralty air officer, in which he said—

The other day a seaplane, one of ours, had attacked a German submarine near Harwich and driven it under water. It lost its

¹ *The World Crisis*, by the Right Hon. Winston Churchill, page 314.

bearings ran aground and was left high and dry when the sea went down.¹

There are many other recorded instances in which our aircraft played a direct or indirect part in destroying submarines. As German submarines, through lack of study of this type of war vessel by the Admiralty before 1914, nearly brought this country to her knees in the Great War, by sinking our food vessels, I think any aircraft that sank or contributed to the sinking or capture of an underwater vessel may be said to have played her part in defeating the submarine menace and making her contribution to victory.

Klaxon, writing in *Blackwood*² observes—

It is curious that both British and German submarine officers have the same opinion of aircraft as anti-submarine weapons. Our boats looked on Zeppelins as scouts only—as bombers they could be practically neglected. The German seaplanes became dangerous towards the end of the War from the fact that they carried machine guns; their bombs were trifling affairs. But any aircraft might locate a boat or patrol and then the boat might just as well not be there, because no target worth a torpedo would be foolish enough to come within range of her once the warning had been given. Similarly, the Germans stated that what they disliked most in the Irish Sea area were the airships and seaplanes that were always passing over them.

They did not fear the bombs these craft carried, but they did dislike having their own position continually reported to the surface patrols who as a result gave them little rest. There is no doubt that the morale of submarine personnel is much affected by continual nerve strain.

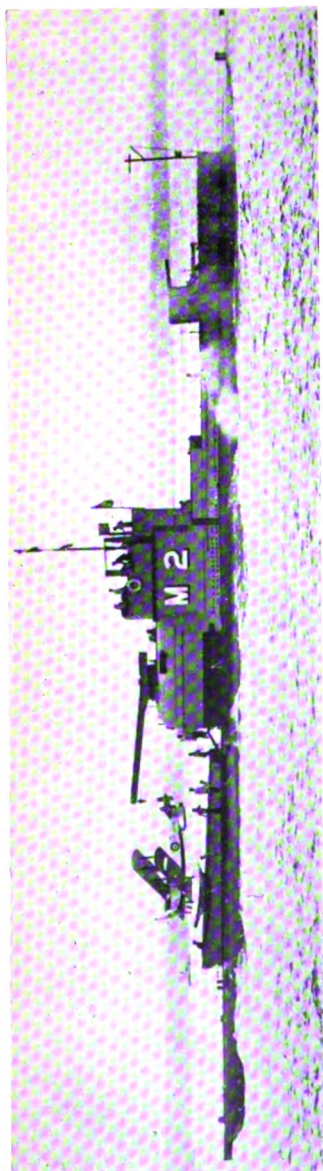
And it is common knowledge that towards the end of the War, the German submarine officers and crews found the strain terrific. That was one of the chief causes for the collapse of the submarine campaign.

They had been kept on the run so much by our gallant comrades, in submarines, surface, and aircraft, that their nerves gave out.

¹ *The World War*, by Colonel Repington, page 209.

² *Blackwood's Magazine*, April, 1919, page 561, Vol. MCCXLII.

PLATE 8A
BRITISH SUBMARINE M2



CARRYING SEAPLANE



SEAPLANE IN FLIGHT



After reading Klaxon's opinion, can Mr. Pollen still hold the view that aircraft were of no value in helping to defeat the submarine menace, and thus securing victory over these ever-watchful and determined foes, that were doing their utmost, by sinking our foodships, to bring the population of this great country to starvation?

For some considerable time the Americans have been developing seaplanes for use in their ocean submarines. The tests have shown that small seaplanes have been carried in underwater vessels with no great difficulty. All-metal machines are preferable to the wood and fabric type for this special service. Plate 8A shows a British submarine with seaplane.

The Japanese are known to have paid some attention to large bomb-dropping machines that can be dismantled and stowed in their ocean-going submarines.

Submarines with a full flying equipment will add to the dangers of future wars, and by having a greatly increased range of vision, they will become more formidable than hitherto. Consequently the question again arises: Should submarines be abolished? My able colleague, Commander Kenworthy, M.P., has just written a most interesting book, entitled *Will Civilization Crash?* It is well worth perusing, and I agree with much he has written, but I totally disagree with the gallant Commander when he advocates that submarines should be abolished. It is the misuse of submarines in war that is wrong, and not their legitimate use, and that is why I have for many years pressed that the League of Nations should summon a conference of international jurists to draw up rules for governing all phases of submarine warfare.¹ Looking at this question of abolition from a torpedoist's point of view: With our vast and scattered Empire so difficult adequately to protect, with our naval and commercial ports at home that need protection, with the narrow waters adjacent to our coastline that require safeguarding, with our naval bases and chief commercial ports abroad, with the recent approval to construct a first-class

¹ Page 92.

naval base at Singapore, with the need of protecting our ever-growing fuel oil depots, with our financial position a little obscure—would it be prudent for us to advocate the abolition of one of the finest and most economic weapons of naval defence in existence ?

In my judgment, it would be more prudent for this country to press for limitation of tonnage for ocean-going and defensive submarines, and not for their total abolition. It has been suggested that if we press for total abolition of submarines, Great Britain will have to abandon her right to blockade, and I do not think Commander Kenworthy will be prepared to advocate that we should give up this right without very suitable safeguards.

The abolition of our right to blockade would, in my opinion, be too high a price for us to pay for the abolition of submarines, even if that were possible.

On 4th February, 1928, Mr. Kellogg, the Secretary of State, informed the Foreign Affairs Committee of the House of Representatives that the United States Government would "be willing to sign a treaty with all the Powers of the world prohibiting the use of submarines entirely."

France answers this proposal by saying submarines are as necessary to France as cruisers are to England.

A truer foreknowledge of the potentialities of submarines has been shown by France than any of the other Powers. At Washington the French made it quite clear that they were not in favour of the total abolition of submarines. This is natural when one considers the wonderful achievements France has made in the development of these under-water vessels from the days of the little *Goubet* and *Gymnote*. It has been declared France wants a strong submarine navy, not merely to protect the passage of troops from her African possessions to Europe, but to defend Madagascar and her Indo-Chinese Empire. Perhaps our good Allies across the Channel find a powerful submarine flotilla of some considerable value across the conference table !

A naval officer wrote in the French Press a short time ago that they only wanted 75 efficient submarines in France to bring the whole of this country to its knees. We must always remember that the French are great experts in all torpedo warfare, and in any conflict these submarines would be handled with far greater efficiency than the Germans were ever capable of. During the War, the commanders of the "U"-boats, by experience, reached a considerable degree of efficiency. But towards the end of the War, the whole German submarine service went to pieces. France has no doubt profited by these War lessons and will, I feel confident, never agree to the abolition of her submarines. But I do feel that, in the interests of the *Entente*, the French would act well by reducing their submarines. I am quite certain that this could be done if the submarine problem was approached properly, and, in the able hands of Sir Austen Chamberlain, we all hope something will be done to get France to cut her new submarine construction programme down.

(4) DESTRUCTION OF GERMAN CRUISER "KONIGSBERG"

Shortly after the outbreak of War, I was instructed by Mr. Churchill¹ to prepare and dispatch a flight of seaplanes to the East Indies Station in the *Kinfauns Castle*.

This ship arrived off the mouth of the Rufigi River on 6th November, 1914, for service in the operations being undertaken to destroy the German raider *Konigsberg*, that was then in hiding up this East African river.

May I recall that this warship was a light cruiser of 3,350 tons, 23 knots speed, armament ten 4.1 in. guns. The *Emden* had a similar armament, but was of slightly less tonnage. A great deal of damage was being done to our shipping by the *Emden* and *Konigsberg*, and it was not until 30th October, 1914, that the latter cruiser was discovered sheltering some way up the Rufigi River, on the coast of German East Africa.

Over forty ships were employed to hunt down the *Emden*

¹ Then First Lord of the Admiralty.

alone, and many were after the *Konigsberg*. The *Emden* was attacked and destroyed by the cruiser *Sydney*, belonging to the Australian Navy, and commanded by a very gallant officer, Captain Glossop, R.N. As naval aircraft materially helped in the destruction of the *Konigsberg*, may I give a short extract from Corbett's book,¹ in which he says—

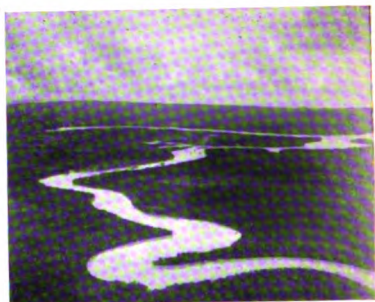
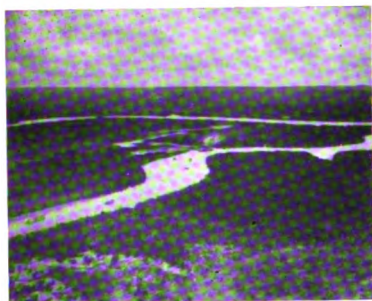
As soon as the *Mersey* reached the first day's firing position she anchored to draw the enemy's fire, while the *Severn* steamed on. One salvo was fired at the *Mersey*, but after that the *Konigsberg* concentrated on the *Severn*. For a mile she steamed on under a rain of salvos untouched, till about 12.30 she was securely anchored and could open fire. By this time Flight-Commander Cull was ready again to spot for her. Seven salvos were fired before he got on, but the eighth was a hit; after that H.T. (Hit) came in almost continuously. In ten minutes the *Konigsberg* was firing only three guns—but then came a signal from the aeroplane, "We are hit, send a boat for us." In fact, hits had been numerous, but though the engine was pierced and failing, the intrepid pilot would not come down so long as he saw it was possible to plane down into the river. Even as he did so, his observer, Flight Sub-Lieutenant C. V. Arnold, continued to signal, with the result that in a couple of minutes more the *Konigsberg* was firing only two guns, and as the wounded machine came down between the two monitors, one only was in action. The last spotting signal was H.T. (Hit) all forward. The *Severn's* guns were at once trained farther aft to get the target amidships, and at 12.52 a large explosion was seen, followed by thick "clouds of smoke" . . . From this point, as the other aeroplane appeared, she fired twenty-eight salvos—the third was a hit, and by 2.20 the target was a wreck, blazing from stem to stern.

No Member of the House of Commons has done more to help the development of the air in this country and keep responsible authority up to the mark than our very popular and firm Home Secretary, Sir William Joynson-Hicks. Lately he has won the esteem not only of his political supporters but even his opponents in the way he has handled questions of much difficulty.

In the early days of aviation he was constantly pressing for progress, and the tactics employed to provide the necessary number of machines, when he challenged that the military wing

¹ *Naval Operations*, Vol. III, page 66.

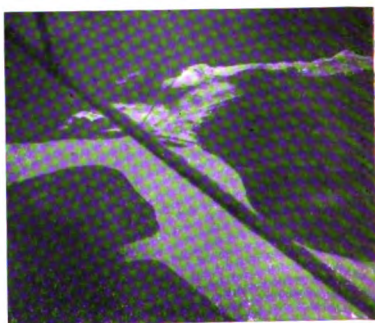
PLATE 9



GERMAN CRUISER " KÖNIGSBERG " SHELTERING IN RUFICI RIVER
EAST AFRICA



" KÖNIGSBERG "
MIDDLE FUNNEL GONE



" KÖNIGSBERG "
PARTLY SUBMERGED

DESTRUCTION OF GERMAN CRUISER " KÖNIGSBERG "
R.N.A.S. seaplane directing monitor's gunfire

aeroplanes should be counted, would make him laugh. I wouldn't swear that the Naval Air Service did not add to General Henderson's numbers to make official statements correct.

When speaking in the House of Commons on 20th July, 1915, Mr. Joynson-Hicks said :¹

The object of my speech is to get the Government to realize the enormous possibilities that there are in our Air Service from a fighting point of view. We realize all that they can do from the reconnaissance point of view. The Air Service—and this is known to the public and therefore can do no harm—aided our ships in the destruction of the *Konigsberg*. They directed our ships where to fire, and without that assistance our guns would never have hit the *Konigsberg*. It was by the co-operation of the aeroplanes that the gunners knew exactly the spot upon which to direct their fire, which ended in the destruction of the *Konigsberg*.

I am convinced that Admiral Sir Herbert King-Hall, one of our most efficient gunnery Flag Officers, who directed these successful operations, made full use of aerial spotting, and was satisfied with the naval airmen's work in helping the destruction of this raider by the monitors. The photographs (Plate 9) were kindly given to me by Flight-Lieutenant Cull. The Admiral knew well the value of clearing the Indian Ocean of this hostile cruiser, which, with the *Emden*, had done so much damage to our shipping, and by so doing released many of our cruisers for more important duties.

May I not claim for my gallant Royal Naval Air Service pilot and observer who so successfully helped to destroy the *Konigsberg*, a small share of victory ?

Perhaps the naval operations that ended in the destruction of this raider have been overlooked by Mr. Pollen.²

I am much surprised at this, as it was the first time in history that a British Naval Commander-in-Chief used aircraft successfully for directing gun-fire for destroying an enemy's cruiser

¹ *Hansard*, Debate on Vote of Credit, 20th July, 1915, col. 1354.

² In writing the preface to Neon's book, Mr. Pollen seems to have forgotten the admirable description of this incident that he gave in his volume *The Navy in Battle*.

that was out of sight of the gun deck of the ship firing the guns. Surely this incident—and an important incident, too—in the Great War, should not have been overlooked by Mr. Pollen, the great pioneer naval fire control expert! What would the late Admiral Sir Percy Scott have said?

“Neon” maintains that reconnaissance by aeroplane is unreliable. Well, the *Konigsberg* was located accurately by that gallant pilot, Flight-Commander Cull, and with the good help of his intelligent observer, Sub-Lieutenant C. V. Arnold, the monitors’ guns were put on to this German raider and she was knocked out (Plate 9). Will Pollen or “Neon” say what more these gallant airmen could have done?

(5) THE NAVAL OPERATION AT ZEEBRUGGE

“Neon” remarks—

It remained for the Navy by her epic effort on St. George’s Day, 1918, to secure the blocking up of the canal at Zeebrugge and to put out of commission a base vital for German submarines.

Ten years ago this April,¹ the Navy carried out one of the bravest deeds in the annals of the British Navy.

The courage and organization required to face some of the finest gunners in the world, operating the most highly-developed artillery, had need to be of a high order. No words of mine are sufficient to record Captain Carpenter’s great exploit in the *Vindictive*. Amongst his fine comrades, who had to face an intense fire from batteries, machine-guns, rifles, was one of our airmen, Squadron-Commander Brock, a most able and brave man. We all felt the loss of poor Brock immensely, as he was such a fine worker and almost any job he undertook he brought to a successful issue.

Other equally brave naval men and marines gave their lives in this daring enterprise.

But “Neon” must not mislead the public. Air photographs showed that the canal at Zeebrugge was not blocked as far as submarines were concerned.

¹ 1928.

It was blocked successfully to large and medium-sized ships, but not submarines. I challenge "Neon" to ask the opinion of the military intelligence officer, who had to examine the air photographs and report the result to the British Commander-in-Chief at the Front, for an unbiased opinion as to whether the channel could have been used by submarines. Perhaps the gallant General will answer ?

As an old submarine man, I am certain "Neon's" statement as quoted at the opening of this chapter is not in accordance with fact.

Another fine act of the War was recently commemorated¹ in the unveiling upon Zeebrugge Mole of the tablet which records the breaching of the Mole by Submarine "C3" during the famous night attack on 23rd April, 1918. The tablet marks the actual spot where the submarine blew a wide gap in the structure and thus helped materially towards the success of Sir Roger Keyes' plan of operations.

The feat which this memorial perpetuates was unique in the history of naval warfare. Nothing like it had ever before been done, and it is unlikely that anything of a like nature will be performed again. Zeebrugge Mole is joined to the shore by a strong timbered jetty, built upon stout open piling, so that the tide can sweep through beneath it. In order that reinforcements from the shore should not be rushed on to the Mole when the *Vindictive* attacked it, Sir Roger Keyes decided that this jetty must be blown up—and blown up it was, exactly at the pre-arranged moment. "The cheer raised by my men in the *Vindictive* when they saw the terrific explosion was one of the finest things I ever heard," said Captain A. T. B. Carpenter, V.C., when describing the incident next day.

For the perilous task of destroying the connecting jetty was chosen "C3," an obsolete submarine. She was stuffed full of high explosives, the equivalent in this of forty submarine mines being packed into her hull, and so arranged that the whole could be touched off instantaneously by means of fuses. "C3"

¹ Extract from *The Observer* of 14th August, 1927.

was manned by the late Lieutenant R. D. Sandford, V.C., in command, Lieutenant Price, R.N.R., Able-Seaman Hamer (coxswain), Leading-Torpedoman Cleaver, Chief E.R.A. Rpx-burgh and Stoker Bendall. All of these knew when they volunteered for the job that it would be a miracle if they survived it. The miracle happened, largely because of a strange misapprehension on the part of the enemy. But that is getting rather ahead of the story.

"C 3," being unable to make the voyage from Dover to Zeebrugge under her own power, had to be towed the hundred miles. The weather was rough, and the submarine wallowed all the way like a huge porpoise, with her crew perched dangerously atop of her perilous cargo. Once, at least, she was just saved from capsizing by the timely breaking of the tow-rope, and the picket boat which, under the command of Commander F. D. Sandford, had been told off to attend upon her, lost her on the passage.

At a point four miles distant from the Mole "C 3" made for the jetty under her own power. When close in, a shift of the wind blew aside the smoke screen and uncovered her to the enemy, who promptly began pouring heavy volleys of rifle fire into her, and pelting her with big guns. If she had been hit she would have blown up prematurely, and her crew killed. That she escaped this fate was almost certainly due to the enemy, who suddenly ceased attacking. Obviously they thought she had missed her way, and that when she reached the piling they would be able to capture her easily. In fact, they rushed down to do this as she crashed into the jetty, burying herself beneath it up to her conning tower.

Just at this moment her crew started the fuses and jumped into a dinghy fitted with a motor, which had towed behind them. The motor refused to work, and the crew had to use oars. Seeing them escaping, the enemy reopened fire upon them with rifles and machine-guns. Lieutenant Sandford, Hamer, and Boxall were wounded, and it seemed impossible that any of the six could escape, when the submarine blew up with an

appalling roar, tearing a gap 150 ft. wide in the jetty, and blowing up hundreds of the enemy. So stunning was the shock of the explosion that it put all guns in the vicinity out of action temporarily, and enabled "C 3's" little band to get safely aboard a destroyer, which took them back to Dover after the fight had ended. Five of them still survive, and some of these will be present at the unveiling of the memorial which commemorates their gallant deed.¹

Wherever our submarines worked, whether in the Baltic, North Sea, Channel, or Dardanelles, they performed great deeds and built up fine traditions.

In the concluding lines of my submarine book, written in 1907, I wrote—

On the energy, skill, forethought and patriotism of the personnel engaged in this branch of torpedo warfare much will depend and great deeds may be accomplished.

We old submarine pioneers are mighty proud of the work done by our submarines in the Great War and the fine men who served in them.

(6) AIR OPERATIONS IN THE ADRIATIC

As the War advanced, the losses from enemy's submarines became distinctly alarming. Very bad reports were being received from the Mediterranean, and just after Lord Fisher left the Admiralty,² I put forward a scheme to put the whole Mediterranean under aerial observation, largely with S.S. airships that Lord Fisher had been so keen about.

All of us who had submarine knowledge knew that the submarine commanders hated to have their movements constantly watched and then to be chased by a high-speed surface craft that the airmen summoned. This was most nerve-racking.

My scheme employing S.S. airships and other types of aircraft was to have cost just over a million pounds. It is on record that we did not lose a single vessel carrying foodstuff or any other merchandise when S.S. and Coastal airship

¹ End of *Observer* extract.

² 1915.

patrols were established. The submarine commanders kept clear of the areas that the airships patrolled, because they knew sooner or later they would either get a bomb dropped near them or a surface ship would detonate a depth-charge in their vicinity. Even if they were not hit, being frequently harassed became very bad for their nerves.

Admiral Mark Kerr, in his interesting book¹ reminds us that—

From 1915 the submarine menace had been growing steadily and rapidly and the Mediterranean being one of the peaceful routes of the Allies was more severely attacked than any other, and it was estimated that the value of the cargoes sunk averaged about two million sterling a day, as well as reducing the sea transport of the world, in which the Allied stores and troops were carried.

In their great wisdom, the Sea Lords refused to approve my scheme for helping to combat the submarine offensive by air at a small cost that would have embraced the whole Mediterranean, and the sinking of our ships continued. Admiral Mark Kerr informs us that the German submarine "U 35" sank forty-eight ships in nineteen days.

This lack of provision of a large number of patrolling aircraft all over the Mediterranean was, in my judgment, most unwise, and the destruction of our shipping in those waters became extremely costly, not only to ourselves, but also to our Allies.

Some little time before creating the Royal Naval Air Service, under Mr. Churchill's powerful support, I had been one of the little band of pioneers working under Admiral Sir Reginald Bacon in introducing submarines into the Navy. After that I commanded a cruiser in the Mediterranean, and then laboured at Barrow-in-Furness and at the Admiralty from 1909 to 1917 at air development, with only a small break when the rigid airship *Mayfly* accident took place.

After such a long spell of administrative work, in trying to do all that was in my power to develop aircraft and forward the interests of the pioneer airmen, I was delighted to receive orders

¹ *Land, Sea and Air.*

early in 1917 to proceed to Southern Italy in command of the Royal Naval Air Service units, for assisting the Italians and French in an endeavour to check the German and Austrian submarines coming down the Adriatic from Pola and Cattaro. My head-quarters were to be at Taranto, but few people in this country had ever heard of this place, though later in the War it became better known. All I could find out was, and those who may be cat lovers will be interested to know, that the Tarantines were the first to import the cat into Europe. On their coins of the fifth and fourth century B.C. cats are shown trying to catch birds. They are also shown on some of the early Apulian vases. The last meeting between Mark Antony and Octavius took place at Taranto (Tarentum) in 36 B.C. The whole place I found teeming with historic interest, but even people in Northern and Middle Italy knew very little about the sunny lands of Apulia, with their wonderful silver-grey olive groves and quaint old towns, all built of a stone that can be sawn and fashioned far easier than wood.

On commencing air work at Taranto, I expected to have some difficulty in forming air stations to help the Italians, French, and our own drifters with the Adriatic barrage, but I was fortunate in finding Admiral Mark Kerr the Senior British Naval Officer at Taranto. He was full out to help the airmen in every possible way and was then the only British Admiral who was really interested, from a pilot's point of view, in air development. Many times I had long talks with him on board H.M.S. *Queen*, his flagship, and it may be that our discussions were helpful to him when he took up an air appointment¹ at a later date. But what impressed me most during my air work in Southern Italy was the attitude of the Italian Admirals towards air development.

At home, and I say this quite frankly, and I hope it is fair criticism, many Admirals seemed to dislike the whole idea of the Royal Naval Air Service making any real progress. There are several airmen who can bear out this statement that a

¹ See page 240.

strong feeling did exist against air development, and none better than Admiral Mark Kerr, for he informs us in his book¹ that one Admiral in a high position said two aeroplanes were enough for the British Navy, and another Lord of the Admiralty resented the Naval Air Service being given the services of four naval lieutenants.

But in Italy all the Italian Admirals I came in contact with were full out to help the airmen of all nationalities. The difference appeared to be most marked between their attitude and that of many Admirals at home.

The Italian Admirals believed that naval airmen could help towards the common end we all had in view. I know they had their Noahs in the Italian Navy, but I never met any.

Admiral Cerri, the Port Admiral at Taranto, was a very fine type of naval officer; he possessed considerable intellectual attainments and was a clear thinker. When first I was presented to him he was working out in much detail a new scheme for netting the Lower Adriatic against the Austrian and German submarines.

He asked me certain questions about mooring nets, and having had all our boom defences under my supervision when working for Admiral Bethell and Admiral Stuart Nicholson, both very able torpedoists and wireless experts in the Naval Ordnance Department at the Admiralty, I was able to discuss the matter in some detail with him.

We were all strangers in a strange land, but Admiral Cerri and Signora Cerri, the charming and beautiful hostess at Admiralty House, Taranto, were most kind to my wife, all my air officers, and myself. Commander Robbo, the liaison officer, did his utmost to help us settle down.

With Admiral Cerri's permission, I established headquarters for our officers and men at Pizzoni, just outside Taranto, and I was fortunate in having a most efficient officer, Commander Beuttler, R.N.R., to take charge of this establishment.

¹ *Land, Sea and Air.*

Beuttler was a born commander of men ; he was before the War the able Superintendent of the Nautical Training School at Heswall. His experience in handling men was of great value, and he soon had a most efficient organization at Pizzoni.

Admiral Mark Kerr inspected my R.N.A.S. men at Pizzoni, and in his book relates—

There was another surprising and pleasant fact in connection with Beuttler and his people. There was no defaulters' sheet. His men would do anything for him and they had a snap in their movements, saluting and dress, and in the way in which they performed all their duties that I had hitherto only connected on active service with the Brigade of Guards.

High praise this for one of the units of the Royal Naval Air Service that could never do anything right in the eyes of some of the Naval Noahs at home !

On my staff I had a very efficient Flag-Lieutenant, Flight-Commander Mitchell, who had done wonderfully well in helping to enlist the large number of personnel for the Royal Naval Air Service, and other work of considerable importance at the Admiralty ; also my secretary, Paymaster Warneford Prall, helped in no small degree to establish good relations with the Italians.

I obtained rooms in the Via Pitagora for administrative offices, and one wit¹ said it was a most suitable place, for did not Pythagoras foresee the wonders of aviation when he expressed, according to Malvolio, the opinion " that the soul of our Grandam might happily inhabit a Bird."

Under Flight-Commander Pulford's able direction, we established an erecting station for our machines opposite Pizzoni.

The former Member of Parliament for Leith, Captain Wedgwood Benn, had taken his pilot's certificate, and gave us much help in these early days in breaking new ground to get the intelligence work and other matters going. He was a delightful comrade and most capable officer. Unfortunately, he was laid low with malaria that was very prevalent at

¹ Captain Wedgwood Benn, M.P.

Otranto, and I had to send him to Rome, where he was nursed back to health by the capable Blue Nurses at the Calvary Hospital at Montecelio. I trust this attack of malaria will not have impaired Wedgwood Benn's general health.

The Italian Commander-in-Chief of the Naval Forces at Taranto, Admiral Cutinelli, held many conferences on board his flagship, at which my old friend, Captain Denti,¹ who flew over London upside down, attended, and we drew up, under the Admiral's able direction, schemes for dividing the Lower Adriatic into zones to be constantly patrolled by the Italian, French, and British aircraft.

Our station was the old-world fishing village of Otranto—Walpole gave the name of *Castle of Otranto* to one of his novels. But I do not know if he ever visited this out-of-the-way place. The castle was built by Alfonso of Arragon, and from the bastion a wonderful panorama of the Lower Adriatic to the Albanian shore is visible.

All the streets in Otranto are adorned with stone balls, some weighing as much as 2½ cwt. ; these missiles were used by the Turks in the great fights they had to capture the castle. Two large catapult arms still remain erected on the castle walls. To me these old-fashioned weapons were of much interest, as during my service in the Navy I had the good fortune to play some part in developing submarines, airships, aeroplanes, seaplanes, kite balloons, and tanks.

In creating our aeroplane and seaplane station at Otranto, we had the good assistance of Commander Rossini, a very capable Italian airman. This gallant officer showed us suitable sites for our seaplane and aeroplane stations, best position for camp, etc., and, thanks to his good offices, when No. 6 Wing arrived we were able to make them pretty comfortable.

In command of this Wing I was fortunate in having an able airman, Wing-Commander Edmonds, who had great experience, having been one of the airmen who took part in the historic Cuxhaven raid of 1914, and the first man in history to sink

¹ Page 122.



CAPTAIN DENTI, ADMIRAL CERRI, STAFF-PAYMASTER PRALL, CAPTAIN WEBSTER, LIEUTENANT HARGREAVES, CAPTAIN ORSINI, COMMANDER BEUTLER, CAPTAIN VALLI, SIGNORA VALLI, ADMIRAL AND SIGNORA CORSI, AND OTHER ITALIAN FRIENDS AT TARANTO, 1917

two surface vessels¹ with two locomotive Whitehead torpedoes dropped from a Short type seaplane in the Dardanelles. Edmonds soon had the station going and our patrols in the air functioning over the Lower Adriatic. Fortunately, all our officers and men got on very well with the Italians, and the kind help of the Mayor of Otranto was very much appreciated by all of us.

Our good Allies, the Italian and French airmen, did fine work in patrolling the zones Admiral Cutinelli had arranged, and the small S.S. airships, that we had previously supplied the Italian Air Service with, were always out on patrol. They must have put in a very large number of hours flying.

The airmen of the Allies had much encouragement from those in authority. Admiral Thaon Di Revel, Commander-in-Chief of the Italian Navy, often came to Otranto to see how the air patrols were getting on, and to ascertain if we required anything. I had the pleasure of showing him the latest Short type torpedo seaplane, capable of dropping from the air an 18 in. locomotive torpedo weighing 1,000 lb. In this machine he was much interested, and praised the neatness of our dropping apparatus.

The only torpedo machines the Italians then had were two Caproni biplanes that I was shown in an aerodrome in the North of Italy near Venice, fitted with ordinary ship's boat's torpedo-dropping gear. Our apparatus was lighter and more suitable for air work than the boat's gear.

Also, with great respect, may I record that the Allied airmen appreciated very much that His Majesty the King of Italy took a keen interest in air matters, for did he not come straight down from the Piavé Front, climb on board the semi-rigid "M" type airship, commanded by a very fine airman, Captain Valli, at Grotaglio, and carry out a long submarine patrol all round the Bay of Taranto and far into the Adriatic? This direct personal interest in the Lower Adriatic air patrols by His Majesty was a great incentive to all the airmen of the Allies in Southern Italy to do their utmost in hunting the elusive submarine.

¹ Page 51.

The late Admiral Camillo Corsi, who had succeeded Admiral Viale as Minister of Marine in 1915, always gave me very sound advice, and with his charming wife and sister-in-law, were most kind to all my air officers. We appreciated very much the way they helped to make the leisure time of our airmen more agreeable. (Plate 10.)

Admiral Solari succeeded Admiral Cerri as Port Admiral at Taranto, and continued the good policy of helping us in every way to increase the usefulness of our air stations.

We were allowed to pull down houses, build slipways at Otranto, and do anything we liked to make the air work in the Lower Adriatic more efficient.

Everything went most smoothly in our relations with the Italians, Lieutenant Riccardo Prevry, our very able liaison officer, worked unceasingly towards this end, and all of us were much indebted to him for his good efforts.

When Admiral Cerri became Commander-in-Chief of the Italian Navy at Taranto, he placed two Italian and two French destroyers at my service for an attempt to torpedo the vessels in Cattaro harbour from the air.

On the 3rd September, 1917, I called upon Rear-Admiral Acton, flying his flag in the *Etna*, at Brindisi, and he informed me that the weather reports from the different meteorological stations were favourable for our operation and the sea was calm. In addition, Rear-Admiral Biscarette had just returned from Valona and had experienced a calm sea during the whole of the passage.

I broke my broad pennant on the senior Italian destroyer, *Ippolito Nievo* (Commander Civalleri) during the afternoon, and proceeded out of Brindisi Harbour with the destroyers *Mosto*, *Bory*, and *Bisson* in company. Later I picked up eight motor launches with six Short type torpedo seaplanes in tow.

During the night nothing of importance happened. The *Etna* informed us a submarine was steering a parallel course to ours. Early in the morning we were challenged by some red flashes, but we were not attacked. (Plate 11.)

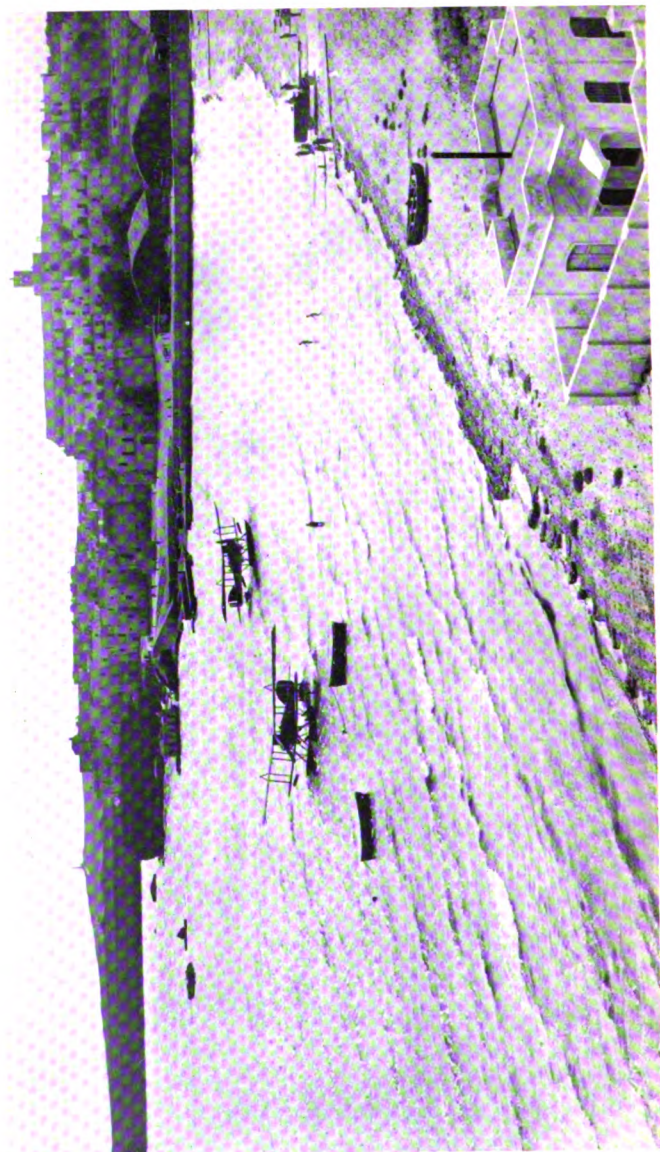
PLATE II



ITALIAN DESTROYER "IPPOLITO NIEVO"
Flying the Broad Pennant of the Author: Adriatic, 1917



BRITISH TORPEDO SEAPLANES AT BRINDISI, 1917



Then suddenly, without any warning, half a gale of wind sprang up. Captains Denti, Civalleri, and Wing-Commander Edwards advised that we should abandon the torpedo attack. I much regretted having to do so, as our gallant pilots under Edmonds were so desperately keen on bringing off a torpedo attack on the ships in Cattaro Harbour. On leaving the Italian destroyer *Ippolito Nievo*, the captains of the Italian and French destroyers came on board and asked me to repeat this torpedo attack, and I promised to do so as soon as we obtained more machines from England.

I relate this attempt on Cattaro to show the good feeling that existed between the naval airmen and our Allies in the Lower Adriatic, and their keen desire to take part in any of our torpedo undertakings.

The presence of a powerful flight of torpedo seaplanes always in readiness at Otranto seemed to act as a deterrent to the Austrian cruisers, as they never came down as far as the Lower Adriatic to give us the chance of a torpedo attack all the time we had these torpedo seaplanes in readiness. (Plate 12.)

No people in the world could have been kinder to our naval airmen than the Southern Italians. In the north the Italians call the people who live in Apulia "colonials," and say they are three hundred years behind the times. That may be so in some districts. But for warm-hearted, generous people, the Italians in the southern provinces would be hard to beat.

They would give us anything. Baskets of figs, wine, grapes—everything they had was liberally showered upon us, and I had the greatest difficulty to give some return to these kindly people. As we passed through Guagnano, near Lecce, Signor Federico Atti and his charming daughters were always most hospitable to us.

Lady Cerri, the wife of the Italian Commander-in-Chief, came all the way to Otranto to visit our airmen, to ascertain if they wanted anything, and to see if they were being properly looked after in our first-aid station. At that time many of our men were down with malaria, which was of a very malignant

type. The mosquito bred largely on Lake Alimino, near by. Not very long after the Armistice we were most distressed to hear that Lady Cerri had succumbed to a grave illness in Rome. The anxieties of the War period must, I fear, have tended towards hastening matters, as she never spared herself in doing good. Lady Cerri will always be a cherished memory in the hearts of the many British naval airmen she was so kind to at Taranto.

Early in 1918 I was ordered to return to England, and Admiral Cerri, the Commander-in-Chief, Commodore Heneage, and many naval officers and airmen very kindly came to the railway station to see me off.

In saying good-bye, the Commander-in-Chief's secretary handed me the following letter—

NAVAL COMMAND,
TARANTO.

17th January, 1918.

DEAR COMMODORE,

On the occasion of your giving up, by order, the Command of the R.N.A.S. in the Adriatic, it affords me great pleasure to express to you my warmest thanks for all the zeal and interest which you have shown and for all that you have done to help the cause of the Allies.

You will regret your departure all the more since it takes place at a moment when the new methods to be tried by the British Admiralty and the more favourable weather conditions render likely the attainment of those military successes which formed the goal of your unwearied labours.

I also desire to convey to you my appreciation of the tact, friendliness, and unvarying courtesy which characterized all your relations with the Chief Naval Command and with other Italian authorities, and by the exercise of which you have still further strengthened the bond of union between the Allies, which will lead us to victory against the common foe.

I ask you to accept, dear Commodore, my heartfelt good wishes and the expression of my deep respect.

VICE-ADMIRAL,

Commander-in-Chief,
(Sgd.) CERRI.

TO COMMODORE M. SUETER,
TARANTO.

This was a kind thought, and I valued the Italian Commander-in-Chief's courteous act very much.

Whether our air efforts in the Lower Adriatic were of value, others are better judges than I am.

Admiral Mark Kerr records that—

In the spring of 1917 we had a slight addition to our anti-submarine in the shape of No. 6 Wing of the Royal Naval Air Service. Excellent work they did under Commodore Murray Sueter and Wing-Commander Edmonds, but there were too few machines capable of patrolling with decent sized bombs to be any real check on the passage of the U-boats to their hunting grounds.

After Admiral Mark Kerr left Taranto, more machines became available, and I am certain Commodore Heneage, his very able successor as Senior Officer, was satisfied with the work of the naval airmen whilst I served under him, and when Wing-Commander Longmore took on the work after I left Southern Italy I have no doubt greater advances in efficiency were made as more machines became available for establishing new bases, as at Valona, etc. Our chief aim was to bomb every submarine using the Adriatic, so as to sink them or make them blind by keeping them under water as long as possible. This increased the risk they ran in becoming entangled in the nets of the drifters or Admiral Cerri's special nets.

In his official letter to the Admiralty, the British Naval Commander-in-Chief, Admiral Sir A. Gough-Calthorpe, who was commanding the Mediterranean Fleet with much distinction, stated that "the number of submarines hunted by British aircraft at my air station at Otranto was remarkable, considering the small number of machines at my disposal."

The constant dread of being bombed by the airmen of the Allies was bad for the nerves of the German and Austrian Commanders, and gradually the submarine menace to our ships in the Mediterranean diminished and finally ceased. In this way the airmen of the Allies in the Lower Adriatic contributed their share, and many brave pilots gave their lives towards the end we all had in view—victory.

(7) DARDANELLES AIR OPERATIONS

WHITEHEAD TORPEDOES DROPPED FROM SEAPLANES

The First Lord gave me instructions to dispatch a squadron of naval aeroplanes to Egypt. I had all the available machines dismantled, packed up, pilots selected, and under Wing-Commander Samson they sailed by orders for Egypt. The Dunkirk Naval Air Station was then placed under the command of Squadron-Commander Longmore, a capable flying officer, who was one of the first four naval men to be trained in this country as a pilot on the machines kindly placed at the disposal of the Admiralty by Frank Maclean,¹ one of the keen pioneers of flight in this country.

As mentioned on other pages, Samson had done well in command of our air station at Dunkirk, and also with the armoured cars, so I knew he would carry out any new work with success. Samson had one grave fault, and that was his demands for machines were insatiable. He seemed to think they were quite easy to obtain, whereas at that time their production was most difficult, because we had so few aircraft building firms, and those we had were poorly staffed, as they had been starved for orders before the War.

However, Samson was well worth supplying with all the machines we could spare, as he had always something to show for his air work.

After No. 3 Squadron had started for Egypt, I was let into a great secret by Mr. Churchill, and that was they were to be diverted to the Dardanelles. Then I was glad I had detailed Samson for command of this Squadron, as he could make an aerodrome anywhere—Lemnos, Imbros, Tenedos, it was all the same to him. If he was given a field or two and a hundred men armed with spades, he would soon have the bumps removed or his men stamping down ploughed land to make it smooth enough for him to land upon.

At first, the machines I sent to the Dardanelles were a

¹ Now Sir Frank Maclean.

scratch lot. They were all that could be spared. Our wireless was poor.¹ Our observers were inexperienced. But the Air Department or the airmen must not be blamed for that. I could get little money for air development before the War. One Sea Lord sent for me and kindly said: "Seventy-five thousand pounds have to come off the naval estimates this year. So of course it must be taken off 'Air'"—and it was. It takes time to work up observers for spotting for battleships and cruisers by wireless. The Navy had not supported their airmen before the War. Consequently, the air help we could give at first to the warships operating in the Dardanelles was not great. But gradually our air effort improved, and being short of senior air officers in the Eastern Mediterranean I was pleased when Mr. Churchill secured the services of Colonel Sykes.² The military wing, in the early stages of its development, owed much to Sykes' great abilities. He was a hard worker, and bore much of the burden in those difficult times in creating a military air service for the Army, which is slightly less conservative than the Navy.

When we had his valuable help for administrative purposes in the Dardanelles, I felt with his and Samson's good efforts everything would go well, and it did. Under Mr. Tennyson d'Eyncourt's advice, I obtained Board approval to secure and fit out a special merchant vessel as an aircraft carrier, under the name of *Ark Royal*. When she was ready for service, the Admiralty sent her to the Dardanelles with a seaplane equipment in February, 1915, in command of Squadron-Commander Clark-Hall, a capable naval gunnery officer, who had then taken on air development with much keenness. His great knowledge of gunnery techniques was most valuable to the Air Service in providing suitable gun armament for our aircraft. The seaplanes of the *Ark Royal*, the machines of No. 3 Squadron,

¹ At a later date our wireless telegraphy apparatus was most efficiently developed by Squadron-Commander Hyde-Thomson, Commander Warrington-Morris and Flight-Commander Basil Binyon.

² Now Sir Frederick Sykes, G.B.E., K.C.B., Member of Parliament for the Hallam Division.

and the kite balloons of the *Manica*,¹ all did useful work off Gada Tepe and from other anchorages in locating trenches, emplacements, mine-fields, examining ships above Chanak, spotting for battleships, as the *Queen Elizabeth*, *Majestic*, etc., bombing Constantinople,² railway bridges on the Adrianople-Dedeagatch Railway, keeping a lookout for mines, submarines, and many other services in connection with the operations. One of Samson's men, Squadron-Commander R. C. Davies, won his V.C. in a very gallant act, by rescuing another pilot under great difficulty who had to make a forced landing in the enemy's very rough country.

One observer in No. 3 Wing was Lieutenant Bernard Isaac, who was well over 40, and used to fly with Samson. This I thought most courageous of him. He was a fine observer and stood the hardships, with more than one immersion in the sea, mighty well.

The history of the Dardanelles operations has been told by many, and it would be absurd for me to make any comments on the details of the military work. But I served some years in the Eastern Mediterranean in the battleships *Anson* and *Trafalgar*, when demonstrating against Turkey during the Armenian massacres, and later in the cruiser *Barham*. In my possession I have letters of appreciation from the Admiralty and my Commander-in-Chief for work done in those waters. But what I could never understand was why the military authorities chose the wrong side for their operations. One nation, I know, had worked out the details of carrying out an operation against the Turks from the coast to the southward of Chanak. Most sailors who knew the Gallipoli Peninsula well would, I feel convinced, have recommended that the military operations, if carried out at all, should have been undertaken on the eastern side.

¹ Page 66.

² Fine work in this connection was done by Squadron-Commander Smyth-Pigott, who had previously distinguished himself by breaking a Zeppelin's back in the Channel, (page 17) Flight-Lieutenant Savory, Flight-Sub-Lieutenants Dickenson and Barnato in April, 1916.

In the Dardanelles we used a novel form of warfare, and that was dropping a locomotive Whitehead torpedo from the air. Being a torpedoist, and having fired for the first time in history a locomotive Whitehead torpedo from a submerged tube in a Holland type submarine, whilst running under water at Barrow, I was naturally keen on dropping a Whitehead torpedo from the air and developing that particular form of torpedo warfare.

Whilst we were building the rigid airship *Mayfly* at Barrow-in-Furness, I discussed with one of my officers, Squadron-Commander Neville Usborne, Lieutenant L'Estrange Malone, and Lieutenant Hyde-Thomson, who was then qualifying as a torpedo officer in H.M.S. *Vernon*, the possibility of dropping locomotive torpedoes from all types of aircraft. At that time an airship could carry the weight, but the seaplane had not been developed, and the aeroplane could hardly carry a passenger and a few hours' fuel.

In 1912, when Colonel O'Gorman and myself visited Germany, we discussed dropping a locomotive Whitehead torpedo from a Zeppelin airship with the German naval officer undergoing training in the *Victoria Louise*, at Hamburg, and in our report to the Committee of Imperial Defence we stated that dropping a locomotive torpedo from an aeroplane offered the best proposition.

The real problem was to develop a powerful engine to enable the great weight of a Whitehead torpedo to be lifted. This I was doing with the help of the Sunbeam Co., a firm we owe much to for the fine way they tackled, with much success, the problem of increasing the horse-power of our aero engines, with a low weight per horse-power. At this time I secured the services of Lieutenant Hyde-Thomson, the very keen young torpedoist, who had just qualified. I had discussed torpedo work with him at Barrow, and he was full out to help me develop torpedo warfare from the air. We called in the services of Mr. Tom Sopwith, the "stand-by" of the Royal Naval Air Service, in many of the difficult air matters that came up for

solution. He built first a mock up, and on the data gained with it in carrying out a long series of experiments, was able to construct for the Naval Air Service a complete torpedo-carrying seaplane. This machine was experimentally a success, and Squadron-Commander Longmore was able to drop, for the first time in history, a Whitehead torpedo from the air at Calshot in 1914. The success of this first experiment indicated that we were on the right lines, and that torpedo-dropping aircraft were a practical proposition. Just before the War, I showed this machine to Mr. Churchill and Lord Fisher, who was then staying with the First Lord on board the Admiralty yacht *Enchantress* at Spithead. The latter was very much interested, and impressed upon Mr. Churchill and myself that we should develop these machines.

After the War broke out, we required all Mr. Sopwith's efforts and those of his factory to produce high performance machines, then just beginning to show some promise. But Hyde-Thomson and myself were quite determined to succeed with a torpedo machine. So I sent for that fine pioneer seaplane constructor, the late Mr. Horace Short. When I explained my requirements to him and the great weight that had to be lifted with a 225 h.p. Sunbeam engine, in addition to pilot and petrol, Horace Short looked at me with a determined grin and said : " Well, if you particularly wish this done, I will produce a seaplane that will satisfy you " ; and he did. (Plate 13.) Horace Short was almost uncanny in his knowledge of what a machine could do, even in its design stages. I never knew him wrong. At times he made me furious with his late deliveries. But in the end he always turned out something far better in performance than I expected, and it was well worth the extra delay.

He paid great attention to details, worked like a nigger, seldom left Eastchurch, and burnt much midnight oil that few except myself knew anything about. Undoubtedly Horace Short was a great loss to air development, as by the gifts of the gods he was a creative genius. Creative work appeals to the

PLATE 13



DROPPING A WHITEHEAD TORPEDO FROM
A TWIN FLOAT "SHORT" SEAPLANE

Short family. They have all done well with balloons, airships (rigid and non-rigid), aeroplanes and seaplanes, and if Oswald Short will only concentrate on seaplane work and think of nothing else, we shall have flying yachts and flying ships before he leaves—which I hope will be a very distant date—this planet.

I obtained Board approval to secure the *Ben-my-Chree*, and fit her out as a seaplane carrier, and in her we placed a flight of torpedo-carrying Short machines, and approval was obtained to send this ship to the Dardanelles under the command of Squadron-Commander L'Estrange Malone, with the express purpose of trying to sink a surface ship from the air. Malone nursed these machines uncommonly well. The air mechanics were very keen on success, and no finer pilots existed than those in this aircraft carrier.

Two of these gallant pilots attacked and sank an enemy's merchant ship off Injeburnu, a Turkish ammunition ship off Ak-Bashi-Liman, and a tug off Nagara.

Three shots, three hits—100 per cent of hits!—made in the very first torpedo attack by two gallant pilots, Squadron-Commander C. H. Edmonds, who obtained two hits, and Flight-Lieutenant J. B. Dacre obtained one hit.

Their names will go down in the history of torpedo warfare as the first men in the world to hit enemy's surface vessels with a locomotive torpedo dropped from a seaplane. My Reader can imagine the delight of Hyde-Thomson and myself when we heard that our gallant pilots had accomplished what they were sent out from England to do.

The late Squadron-Commander Hyde-Thomson and myself had slaved at this branch of torpedo work for some years, and had carried out innumerable trials in getting a machine to carry the torpedo, dropping it in the right way, and the hundred minor details that a problem of this nature involves. As our secret patent becomes an historical document for torpedo warfare records, and, by permission, is no longer secret, I publish it in Appendix II. Mr. Horace Short's promise was

fulfilled, and he came up specially to see me at the Admiralty to receive my full forgiveness for past delays in delivery of his machines, and my very warmest thanks for building the seaplanes that enabled our pilots to accomplish this great torpedo feat.

The reader will realize that to torpedo a warship or merchant vessel by a submarine destroyer or torpedo boat you have to risk a large number of men, often over a hundred, whereas in torpedo work from the air you carry the same weapon and risk only one or two men, and owing to the aircraft's high speed and comparatively little cost, a large number of seaplanes or aeroplanes can be provided for the expenditure that would be incurred in building a destroyer. It may be argued that they can be easily hit when the machine vol-planés, then flattens out to release the 1,000 lb. torpedo. But their speed on the downward glide may be well over 150 miles an hour, and if they attack in numbers, which they would do, the captain of guns in a ship would have some difficulty in hitting them in a clear atmosphere. If the ship is put under a slight smoke screen, the torpedo machines will get in all right and few will be lost. They would no doubt be supported with bombing machines, and the poor old obsolete battleship, as we now know her, would have a poor time, even were my gallant colleague Admiral Beamish¹ to be in command of her.

Now a brief word about torpedo aeroplanes. I invited Mr. Tom Sopwith to come and see me at the Admiralty, and asked him to consider the question of building a torpedo aeroplane. Sopwith was a great constructor, and never failed in anything I asked him to undertake. He thought my proposition was very stiff, as it meant building a light aeroplane round the Whitehead torpedo, and he had better think it over.

I confirmed my conversation by the following memorandum, which is no longer secret, as it has been read out before the Royal Commission on Awards to Inventors.

¹ Page 70.

*Most Secret.*ADMIRALTY,
S.W.

TORPEDO-CARRYING AEROPLANE

Will you please go into the question with as little delay as possible re—

Torpedo-carrying aeroplane with 4 hours' fuel and pilot.

(1) To carry one 1,000 lb. locomotive torpedo.

(2) To carry two 1,000 lb. locomotive torpedo.

Torpedo aeroplane will probably be discharged from a catapult, giving the machine an acceleration of 90 f.s. in 60 ft.

Details of experiments with a 225 Short Seaplane are attached.

MURRAY F. SUETER.
9.10.16.

ADMIRALTY,
S.W.
9.10.16.

The following are the results of six flights from *Campania*, in each case the machine being a 225 Short carrying—

Pilot, passenger, full fuel (5 hours)

W/T and spares, a total load of 1,139 lb.

- | | | |
|-----|--------------------------|--------------------|
| (1) | In relative wind of 30k. | got off in 106 ft. |
| (2) | " " 30k. " " | 193 ft. |
| (3) | " " 35k. " " | 98 ft. |
| (4) | " " 40k. " " | 60 ft. |
| (5) | " " 40k. " " | 47½ ft. |
| (6) | " " 27k. " " | 150 ft. |

Weight of these machines fully loaded as above is about 2½ tons = 5,000 lb.

Of this floats weigh 450 lb.

Mr. Sopwith went carefully into my request, and finally produced the torpedo aeroplane which he named the *Cuckoo*. When this special aeroplane was nearing completion, I was ordered to Southern Italy, and nobody took much interest in a torpedo machine at that time.

However, one day Wing-Commander Longmore was visiting Messrs. Sopwith's works, and saw the *Cuckoo* triced up to the beams of one of their workshops, and, pointing to it, asked

"What is that machine?" "Oh, it is Sueter's torpedo aeroplane." Longmore had the machine tried, and this "dud" turned out to be a great success!

The Admiralty then ordered hundreds of this type, and for production purposes the work was given to a very able aeroplane constructor, Mr. Robert Blackburn. In the course of manufacture he was able to make some improvements in these machines, and they were then of greater value. (Plate 14.)

But valuable time had been lost, and they were too late to be of any use in the War. To show the value of my torpedo aeroplane, after the Armistice the battleship *Malaya* was attacked with eight of these torpedo aeroplanes when under weigh, and seven hits were obtained out of eight shots.

It is always a sad thought to me that the Admiralty, in their great wisdom, built hundreds of these torpedo aeroplanes too late to be of the slightest use in the War, and the date of my memorandum to Mr. Sopwith is 9th October, 1916.

Mr. Blackburn has devoted much time and skill in perfecting torpedo aircraft, and I notice he has supplied Japan, the United States, Spain and Greece with torpedo machines.

I have no doubt the Blackburn Aviation Co. share with me the view that before universal disarmament takes place a great future lies in torpedo aircraft for war purposes.

Seven months before the Battle of Jutland, I asked to be allowed to build 200 invisible-winged—as far as I could get them with some new material then in my possession—torpedo machines; but my submission was not approved by the Board of Admiralty, and nothing was done until too late. I may be quite wrong, and my brother seamen and airmen must be my judges. I always thought the morning after Jutland, 1st June, 1916, when the German Zeppelins were reporting the movement and position of Lord Jellicoe's Fleet—with the weather none too clear—would have been ideal for making a torpedo attack from the air on the retreating German Fleet.¹

Admiral Harper is my authority for saying that the

¹ *The Truth about Jutland*, page 138.



BLACKBURN-NAPIER "DART" DROPPING A WHITEHEAD TORPEDO

Capable of landing or taking-off from the deck of an aircraft carrier; 450 h.p. Napier aero engine; centre portion constructed entirely of steel; single seater
(*The Blackburn Aeroplane and Motor Co., Ltd.*)

Admiralty had the information that Admiral Scheer intended to return by the Horns Reef. In making torpedo attacks by aircraft, no better place could have been chosen than the North Sea, with its low-lying clouds. In many days of the year their average height is 1,000 to 1,500 ft. The torpedo machines could conceal themselves in the clouds, then, in making an attack, vol-plané down at an angle of 45 degrees to the vertical. A velocity of at least 90 to 150 miles an hour should be attained before flattening-out and dropping the torpedo. The machine would attack obliquely and retire obliquely, and it is obvious that the captain of guns would have only a few seconds to get their training on to frustrate an attack of this nature.

The whole essence of a torpedo attack from the air is numbers and being able to deliver the attack on any bearing. From a theoretical point of view, the machine should take full advantage of the wind, so as to attain maximum velocity in delivering the attack. The flattening-out before releasing the torpedo 10 to 15 ft. from the surface of the water should be the minimum, and just sufficient to enable the torpedo to drop clear. On release, the machine, being relieved of a great weight, will have increased climbing power for retiring obliquely.

For a skilful pilot there is no great difficulty in making a torpedo attack. Success depends on speed, and that is why I favoured the development of the aeroplane for torpedo attacks in preference to the seaplane.

Under certain circumstances, both types may be of great value.

If our merchant ships are attacked in another war the seaplane would no doubt be largely used, and I think our statesmen would be wise to keep this form of attack on our food-carrying ships in mind.

When one considers that Scheer's rendezvous was known, and that clouds were low, it always seems to me that perfect conditions existed for torpedo operations from the air on the enemy's fleet. It may be argued that our enemy might have

used this weapon upon our ships. But we were well ahead of the Germans in torpedo air warfare, as shown by some of the attacks they made with torpedo seaplanes on our ships off the Belgian coast.

As I have recorded, a torpedo seaplane was shown to Mr. Churchill and Lord Fisher in 1914. Three shots were fired by torpedo seaplanes in the Dardanelles in 1915 and three hits were obtained.

There was ample time to develop torpedo aircraft before the Battle of Jutland.

But in their great wisdom, certain Sea Lords first deprived the Grand Fleet of having the same aerial reconnaissance facilities as Admiral Scheer had with his Zeppelins the morning after Jutland, and then denied them the use of a deadly weapon—the torpedo dropped from aircraft.

Jutland would have been told differently if these Sea Lords had listened to their airmen. But they preferred to make war on some of them, instead of the Germans, as Lord Curzon's letter¹ to me plainly shows.

The stupidity in blocking torpedo aircraft when they could have been of some use, and then ordering several hundreds which were delivered too late to be used in the War, is quite beyond all comprehension.

Bomb dropping before the War had not received much study. Commander Samson was one of the first officers to turn his attention to this form of attack, when he was in command at Eastchurch, and I procured for him some dummy bombs for practice purposes.

We were fortunate when War broke out in having Mr. Martin Hale, a fine inventor, to develop some bombs for the naval airmen, and his bombs enabled us to attack with considerable success the German Zeppelins before they raided this country. Having no proper bomb sights or release gear, we had to concentrate on developing these necessities, but it was some considerable time before my armament section,

¹ Page 239.

under Squadron-Commander Finch Noyes's able guidance, succeeded in producing a simple and reliable bomb-dropping apparatus.

The problem of bomb dropping from aircraft is not quite so easy as one might imagine. Many factors come into this problem, such as speed of machine, altitude, size, shape and weight of bomb, instantaneous release, etc., also the wind velocity may be different at height bomb is dropped from that which prevails nearer the surface. Quite unlike the projectile from a gun, the bomb, when released from the machine, has a speed equal to the horizontal speed of the aircraft.

Accurate bombing tables are now worked out, and bomb sights have increased in efficiency. But in all cases of bombing an important target, such as a battleship, it is wiser to straddle, as a near miss is as good as, sometimes better than, a direct hit, because the water projectile thrown up by a bomb detonated well under the surface of the water is most destructive.

Our observers in the early days were none too well trained. Why should they have been? We were not allowed to develop the air service as we wished. Admiral Mark Kerr informs us that an Admiral in a high position objected to the Royal Naval Air Service being allowed four naval officers for training as pilots. It was difficult to get money enough to provide the machines for allowing our pilots to go in the air. There was no money available for anything else. "Neon" states—

When the *Gosben* was ashore at Nagara Point in January, 1918, she was repeatedly bombed by the R.N.A.S. Altogether some 270 flights were made and 15 tons of bombs were dropped; only one of all these seemed to have hit the cruiser.

I cannot think these figures can be quite accurate; if they are, there must have been some reason for this poor result, when one remembers that Warneford hit a Zeppelin travelling at her maximum speed in the air with a Hale bomb in 1914, and Marix hit the Dusseldorf airship shed with a Hale bomb the same year.

If the figures given by "Neon" are accurate, the pilots who

bombed the *Goeben* put up a poor show, but they are not the only ones who made indifferent shots in the Great War, as the following will show—

In 1912, in a discussion on a paper read by Admiral Sir Reginald Custance before the Institution of Naval Architects, dealing with "Some Military Principles which bear on Warship Design," Mr. A. H. Pollen observed—

All tactics of war must always be built up upon the things that are capable of being made certainties. You must found your tactics on weapons of precision. The only weapon of precision that you have is the gun.

Mr. E. F. Spanner, in his most interesting book, *Armaments and the Non-Combatant*, informs us that the *Invincible* and *Inflexible* fired over 1,200 rounds with their 12 in. guns before those two weaker, unarmoured German vessels, *Scharnhorst* and *Gneisinau*, were sunk. Admiral Sturdee, speaking on this subject, said—

One of the officers told me that they had received upwards of thirty 12 in. shells in the *Gneisinau* and nothing blew up, and eventually they opened their submerged tube to sink the ship.

Mr. Spanner says our two battle cruisers expended 75 per cent of the ammunition and secured 5 per cent of hits, and quotes Mr. Wilson, who states at Jutland—

The total made by the British was 100 hits with 4,598 heavy shells (1,239 of them of 15 in. calibre), or about 2.2 per cent of hits.¹

These are Mr. Pollen's weapons of precision! Compare them with the torpedo seaplane used in the Dardanelles operations, when three Whiteheads were dropped and three hits obtained—100 per cent of hits, Reader, in war time.

But what I would desire most is that "Neon" should obtain from the First Lord of the Admiralty the reason why the *Goeben* was not attacked with the two special Short torpedo seaplanes that were sent from Otranto for the purpose of attacking her with the deadly locomotive torpedo, whose

¹ *Armaments and the Non-Combatant*, page 120.

accuracy from the air was shown by Edmonds and Dacre obtaining three hits out of three shots, nearly three years before, and not very far from where the *Goeben* was then stranded. Bright moonlight nights were experienced during the time these two machines were available. The pilots were highly trained, most skilful, and fretting to make this attack.

These machines arrived three and a half days before the *Goeben* was refloated, and, I repeat, during moonlight nights. Ideal conditions for this form of attack against a crippled ship.

I have asked for this information in the House of Commons, but to my amusement it has been denied me.

My "Air Baby," how very naughty you were; you gave me much concern. Before you were out of swaddling clothes you had developed a penchant for playing with that highly-scientific weapon, the Whitehead torpedo—three shots, three hits, in the Dardanelles; 100 per cent hits. Well done, Edmonds and Dacre. Your fine achievement will be handed down as one of the great feats of torpedo warfare.

(8) AIR OPERATIONS IN MESOPOTAMIA

On receiving instructions to dispatch a flight of naval seaplanes for work in Mesopotamia, the Air Department detailed four officers, including the Officer in command, Squadron-Commander Gordon, one warrant officer, and twenty-one ratings for this duty.

Three Short seaplanes (150 h.p. Sunbeam engines), and one Sopwith seaplane (100 h.p. Gnome engine) were sent out to start the seaplane station at Basra. After some experience, aeroplanes were found to be of more use than seaplanes, so two of the seaplanes were converted to aeroplanes. Additional machines were sent out later, and with the machines of the Military Wing, General Gorringe had on the 4th April, 1916, eight aeroplanes and three seaplanes available for his operations on the Tigris.

General Gorringe received accurate reports about the Turkish

trenches which were no doubt of value to him. We are told in the official history that on the 10th April, General Lake informed General Townshend that it was distinctly doubtful if Kut could be relieved by the 15th, and asked if it were possible to increase the garrison time limit of resistance. General Townshend thereupon further reduced his already scanty scale of rations and reported that in consequence he would be able to hold out until the 21st April.

General Lake then made arrangements for the Air Force to drop a certain amount of food supplies into Kut ; and on the 14th General Townshend reported that he could hold out till the 29th April, as the extreme limit, but that after the 23rd, except for meat, he would be entirely dependent on food dropped by our aeroplanes. (Plate 15.)

To show what our Tommies and Airmen had to put up with in these operations for the Relief of Kut, the official historian says—

The weather was now becoming very hot in the daytime and the glare of the sunlight with dust outside the inundated areas was very trying ; and in addition all suffered greatly from the plague of flies, mosquitoes, and sandflies.

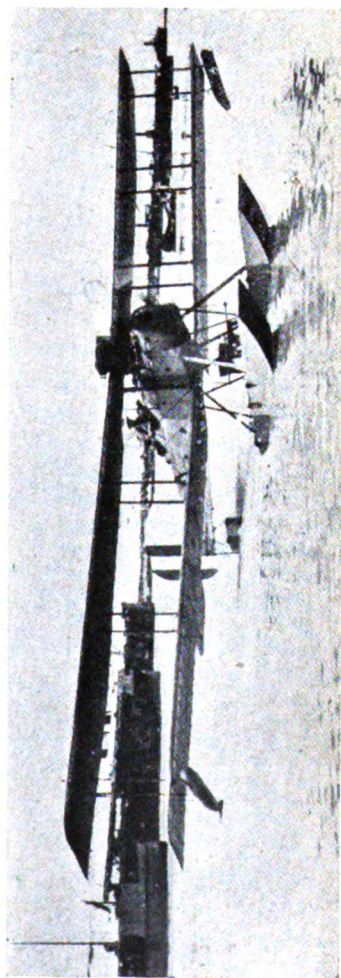
A Member of Parliament who was in Mesopotamia at this period describes in *Mons, Anzac and Kut* his experience of the flies—

Nothing that I have ever seen or dreamed of came up to the flies. They hatched out until they were almost the air. They were in myriads. The horses were half mad. The flies were most tiny. They rolled up in little balls when one passed one's hand across one's sweating face. They were on your eyelids and lashes and in your lips and nostrils. We could not speak for them and could hardly see.

Trueing-up an aeroplane in these conditions was none too easy work for our aircraftsmen. On the 12th, General Townshend learnt from General Lake that the Air Force Commander thought that it ought to be possible for him, given favourable weather, to put 5,000 lb. of supplies daily into Kut. But it was found later that the bulk of flour was so great in comparison



AEROPLANES PROTECTED WITH MATTING AGAINST THE HEAT OF THE
MESOPOTAMIAN SUN



R.N.A.S. SEAPLANE RETURNING TO SLIPWAY AT BASRA, 1916

to its weight that it was difficult to carry in the aeroplanes, and, consequently, only about 2,500 lb. could be dropped into Kut daily. But then engine trouble with the machines, interference by enemy's aeroplanes, bad weather, prevented the amount of food it was hoped to drop from aeroplanes being maintained. The total amount of food dropped from the 15th to the 27th April was about 16,800 lb. It was all dropped from heights of 5,000 to 8,000 ft., as hostile aeroplanes and Turkish gunfire prevented dropping the food from lower altitudes.

The largest amount dropped in one day was not more than 2,000 lb.

The climate, exposure, hard wear and tear were all against good air work in that country, by either the Military Wing or machines of the Naval Air Service, and it is recorded in the *Official History of the War, Mesopotamia*,¹ that—

The British Air Force were also affected by the general shortage of transport, as, owing to this reason, they were unable to maintain at the front adequate facilities for keeping their machines in the necessary state of repair. However, General Gorrington speaks very highly of the work of our airmen and the way they rose superior to all these difficulties.

(9) ESTABLISHMENT OF SOUTH AFRICAN AVIATION CORPS

In carrying out our duty at the Admiralty, we were called upon to assist the Union Government of South Africa in establishing the South African Aviation Corps.

Our efforts to help in this direction were appreciated by authority, as the following letter shows—

GOVERNOR-GENERAL'S OFFICE,
PRETORIA.

24th June, 1915.

SOUTH AFRICA,
No. 745.

SIR,

I have the honour to transmit to you herewith the document mentioned below, on the subject of an expression of appreciation of

¹ Vol. II, page 369.

the valuable assistance rendered to the Union Government in connection with the supply of aeroplanes and the establishment of the South African Aviation Corps.

I have, etc.,

(Sgd.) **BUXTON**,
Governor-General.

THE RIGHT HONOURABLE
A. BONAR LAW, M.P.,
Etc., etc., etc.,
Colonial Office, LONDON.

PRIME MINISTER'S OFFICE,
PRETORIA.

24th June, 1915.

MINUTE 778.

MINISTERS have the honour to request that His Excellency the Governor-General may be good enough to convey to His Majesty's Government an expression of their great appreciation of the valuable assistance rendered the Union Government by Captain Sueter, Director of the Air Department at the Admiralty, and Flight-Lieutenant Lan Davis in connection with the supply of aeroplanes and the establishment of the South African Aviation Corps. The Union Government is very grateful for all the assistance rendered the High Commissioner for the Union in London by these and other Imperial Officers, without which the successful establishment of the South African Aviation Corps could not have been undertaken and accomplished.

(Sgd.) **J. O. SMUTS.**

(10) INTRODUCTION OF KITE BALLOONS FOR SERVICE IN NAVY AND ARMY

When in Vienna in 1912 with Colonel O'Gorman, we were taken to inspect the Austrian Military Aviation ground at Wiener Neustadt, and afterwards Colonel Uselal kindly arranged for us a trip in the Austrian Parseval airship from Aspern to Fishamend. We were also shown a military kite balloon of the Parseval pattern. These kite balloons (*drachen*) were supposed to be secret, but the Austrian officers sent their kite balloon up to 2,000 ft. for our inspection, and we examined

the winch, method of wire attachment, construction of the envelope, system of working, etc.

This type of balloon was invented by Major Von Parseval in 1894, the same officer who invented the airship that bears his name.

When in Antwerp on the 4th October, 1914, I went on board one of Commander Littlejohn's armoured trains that he was running so successfully for the defence of Antwerp. Mr. Churchill desired me to help him with aeroplane spotting as much as possible. We were under fire from the enemy, who had a kite balloon spotting for them, and our 4·7 in. was about to reply when I told the captain of the gun I would give him a guinea if he brought the Drachen balloon down. Gunner's Mate T. Potter fired six rounds and the last one brought the kite balloon down with a run.

I handed over my guinea, congratulated the captain of the gun, and forgot the incident. One day, several years later, I received an enormous packing case, and found inside a well-polished 4·7 in. cartridge cylinder mounted on a fine stand as a gong, with a delightful inscription in memory of our Waerloos fight in an armoured train for defence of Antwerp. The cartridge cylinder was the actual one fired that brought the kite balloon down. I valued Commander Littlejohn's and his crew's kind thought very much.

During October and the autumn of 1914 we tried our best to help the monitors in spotting their fall of shot when they bombarded the coast round about Nieuport, and amongst the aircraft I detailed for this duty were two spherical balloons and their equipment, under Wing-Commander Maitland, to see if they could be of any use. These balloons were good in very fine weather, but quite valueless in a breeze, and in discussing the matter with Maitland we decided to develop kite balloons. I sent Maitland to get in touch with the nearest kite balloon being used on our front, which belonged to the Belgian Field Army, then at Alveringen. The Commanding Officer of this kite balloon section gave us all the information he could,

and was most helpful in explaining the equipment to Maitland. We sent Flight-Commander Mackworth to Chalais-Meudon, the kite balloon establishment of the French Army. On the reports sent in by these officers I asked approval from Mr. Churchill to purchase some kite balloons and form kite balloon sections for training. This was in accordance with the Air Department's general policy to develop all aircraft that were likely to be of value in the War.

The First Lord's approval was readily given, and, under the late Wing-Commander Maitland's able supervision, I started a kite balloon school at Roehampton. (Plate 16.)

Suitable training grounds were placed at the disposal of the Royal Naval Air Service by the Roehampton Club, a kindness we very much appreciated. The French air authorities willingly let me have two kite balloons and a winch, with a set of spares, and lent me some instructors for training our first section in making kite balloon ascents. Every phase of this work was studied scientifically by a very able staff we gathered together. Commander Delacombe, who was a cadet with me in the *Britannia*, placed his services at my disposal, and we entered him as a Flight-Lieutenant, from which position he rapidly rose, as his work for the kite balloons was most valuable.

Two masters of ballooning, C. F. Pollock and S. Dunville, placed their expert knowledge at our disposal, and as Squadron Commanders became the backbone of the kite balloon work at Roehampton. Dunville and Pollock also helped us with the S.S. airships at Wormwood Scrubs in the early days.

One of the first to join up with us was Mr. A. J. O'Reilly, who came all the way from Esquimalt, British Columbia, to offer his services. I knew him when I was a midshipman in H.M.S. *Swiftsure*, and thought it most sporting of him to come such a distance to help us. He ended up by commanding a kite balloon section at Milford Haven, and was a most efficient officer.

We entered an exceedingly able photographer, Lady Sybil Grant, as an air mechanic, first class, for photographic duties.

PLATE 16



R.N.A.S. KITE BALLOON AT ROEHAMPTON
Photographed by Lady Sybil Grant

Her help in our experimental work was of great value, as we had to learn the kite balloon business from the beginning and advance step by step, taking photographs as we went along.

Everybody who worked hard for the development of the kite balloons were well repaid for their efforts, as they were soon brought to fruition. In April, 1915, an urgent message came for me to attend at once in the First Lord's room. There I found Mr. Churchill in animated conversation with Lord Kitchener. Mr. Churchill introduced me to the great soldier, and then said—

“General Henderson has not provided any kite balloons, and Lord Kitchener wants some of yours for spotting for the artillery at the Front.”

I explained to Lord Kitchener that we had only just formed up the sections, and they were not well enough trained to leave Roehampton.

“Oh,” he replied, “that doesn't matter. They will soon pick up their work. You train them all you can and let me have them as soon as possible.”

This, and subsequent interviews I had with Lord Kitchener were most interesting. I have read that Lord Kitchener lost grip. All I can say is this. I went into the whole question of supply of kite balloons in detail with him, gave him full particulars of the fabric used in the construction of the envelope, how it was built with its deep rudder, method of slinging the car, wire holding-down ropes, supply of hydrogen in bottles, their transport, winches, bagging the envelope down, etc. Small points these, but all necessary for efficiency. I have never known a Senior Officer grasp these small technical points so quickly as Lord Kitchener did, and I envied those who worked for such a fine Chief.

After they had received a little more training, the Naval Air Service supplied the first Kite Balloon Section to the Army in France. Other sections followed as soon as we could give them a few weeks' training, and by August, 1915, we had sent five complete sections to France.

Then the War Office took over the personnel of these sections for administrative purposes, but the Admiralty continued to supply the necessary material and equipment.

Lord Kitchener thanked me for the Air Department's small service to the Army, which I thought nice of him to bother about when I remember the great responsibilities he had to shoulder at the time.

In March, 1915, the Commander-in-Chief, Mediterranean, Admiral de Robeck, asked for a balloon for spotting in the Dardanelles, and I obtained Board approval to acquire the steamer *Manica*, then at Manchester. The Director of Naval Construction, Mr. Tennyson d'Eyncourt, recommended this ship to me, and we soon had her fitted out as our first kite balloon ship. The Admiralty sent her to the Dardanelles, and I placed the kite balloon work in charge of Flight-Commander J. D. Mackworth.

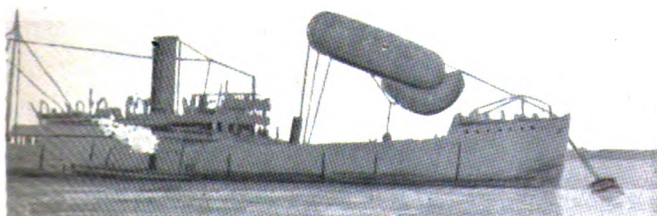
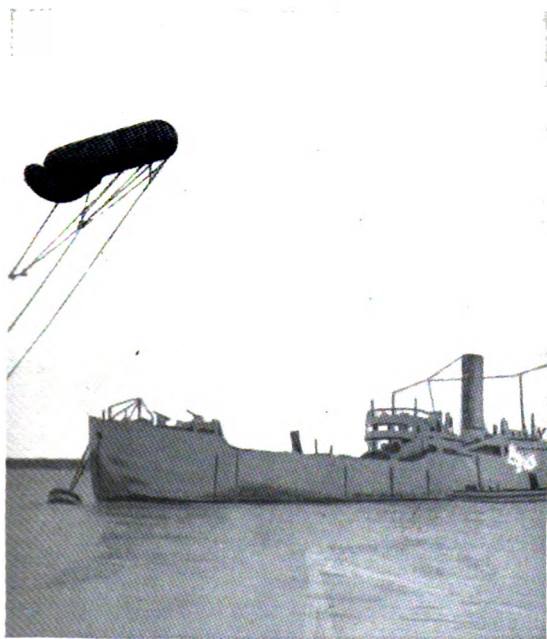
This was the first time in history a kite balloon was used for naval purposes, and from the reports received, Mackworth's gallant little band did useful work in spotting for the warships in the Dardanelles operations. (Plate 17.)

In the Christmas, 1918, number of the *Aeroplane*, Mr. C. G. Grey tells us the story of the kite balloon observer signalling his observations to a battleship which was trying to hit the *Goeben* over the top of Gallipoli, and having all his work undone by a German wireless operator, who was sending misleading signals on the Navy's own seaplane wavelength. This I had not heard before, but it is quite likely to have happened.

We had at first considerable difficulty in providing a wire of sufficient strength to stand towing from a warship in strong winds, but our Kite Balloon Section at Roehampton soon overcame this trouble, and by the end of 1916 a good many of the leaders of divisions in the Grand Fleet were provided with kite balloons and were finding them useful.

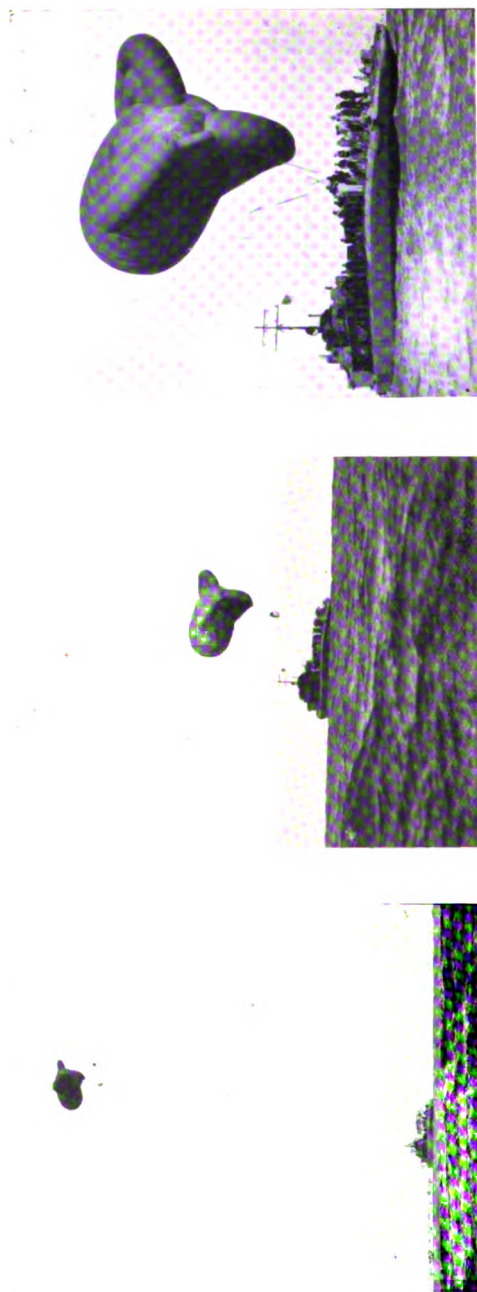
When in Paris I was shown the Cacquot kite balloon, invented by a French Army air officer. In this type, the attachment of the cable is forward of the centre of pressure. To

PLATE 17



KITE BALLOON SHIP "MANICA"

PLATE 18



“ P 28 ” TOWING R.N.A.S. KITE BALLOON (CACQUOT TYPE)

obtain this, a more or less fan-shaped envelope is used, fitted with a large, inflated tail. This balloon is designed to work in high winds, and is a great improvement on the Parseval type; also in carrying out a number of experiments we found it towed better.

Plate 18 shows a Cacquot kite balloon being towed by "P 28."

Poor Maitland lost his life in the unfortunate accident to No. 38 Rigid Airship, alluded to on page 126, but he was always pleased the kite balloons under his nursing turned out such a success.

Lord Jellicoe informs us in his fine book that—

The *Campania* had also been fitted to carry a kite balloon aft, for use for spotting the fall of shot and for reconnaissance purposes. This fitting was the beginning of the arrangement, gradually introduced during 1916, of carrying kite balloons in capital ships.

The success in large ships led, before the end of the year, to them being also provided for light cruisers, destroyers and other small craft, an arrangement which proved of great use for anti-submarine and convoy work.¹

In addition to providing kite balloons for carrying ships and warships, a large number of kite balloon stations were established during the War at points of importance. After reading my notes and Lord Jellicoe's opinion on the value of kite balloons, I think my reader will agree with me that the naval airmen were wise in developing kite balloons for service in the Navy and Army during the Great War.

(II) BOMBING BATTLESHIPS. SHOULD BATTLESHIPS BE ABOLISHED BY AGREEMENT AT A FUTURE WASHINGTON OR GENEVA CONFERENCE ?

"Neon" observes that—

The cost of bombing a battleship at sea by aircraft was discussed at the American hearings and shown to be simply enormous.

¹ *The Grand Fleet*, by Lord Jellicoe, page 185.

Surely "Neon" is confusing matters. If the report on these experiments is read, it will be found that the American authorities distinctly state that the small-size bombs were dropped in the first runs to see the effect. Heavy bombs were dropped at the end and the results I will give in this chapter.

Then "Neon" goes on to say—

It was estimated that such a ship might be disabled—not sunk—if four heavy bombs were dropped directly on the ship or very close to her.

The second part of "Neon's" opinion appears to contradict the first. The expenditure in providing four heavy bombs cannot possibly be enormous. Where does this great expense lie? Surely it is only necessary to disable a battleship. Then she can no longer keep in the fighting line, and becomes a lame duck, open to attack from all the air, surface, and under-water flotillas, eager for her destruction. The cost of these bombing operations would be trivial compared with the expenditure required to build one of our newest battleships of the *Rodney* type.

In the House of Commons seven million pounds sterling has been mentioned as the cost of construction of these new battleships. But I make it, if all charges are taken into account, somewhat higher. The annual cost of keeping one of these huge battleships runs into big figures, as disclosed.

When I asked the First Lord of the Admiralty if he would state the annual cost of the upkeep of a battleship of the *Rodney* class, including pay of personnel, food, stores, overhauling engines, repairs, docking, spares, and share of dockyard charges, etc., to keep her in an efficient state; the cost, approximately, of the oil used by a battleship of the *Rodney* class when in commission and carrying out normal peace duties; and if he would state the annual cost of practice and battle firing of a battleship of the *Rodney* class, the reply was—

The annual cost of upkeep is £432,960, which includes £22,150 for cost of oil fuel, and £40,990 for cost of practice firing.

The Admiralty kindly informed me that the number of capital ships allowed to the British Empire under the Washington Treaty at present is twenty, and in December, 1927, the distribution of these ships was as follows—

<i>Full Commission</i>	. 11	(<i>Nelson, Ramillies, Revenge, Royal Oak, Barham, Queen Elizabeth, Valiant, Warspite, Renown, Repulse, Hood.</i>)
<i>Reduced Commission</i>	. 5	(<i>Benbow, Emperor of India, Marlborough, Iron Duke, Tiger.</i>)
<i>Building</i>	. 1	(<i>Rodney.</i>)
<i>Dockyard Hands for Large Repairs</i>	. 3	(<i>Resolution, Royal Sovereign, Malaya.</i>)

On the 7th December, 1927,¹ I asked the First Lord of the Admiralty whether he could give the annual cost for the care and maintenance of all the capital ships allowed under the Washington Agreement, when in full commission, reduced commission, and in dockyard hands for large repairs.

Mr. Bridgeman very kindly replied—

“The annual cost of maintaining typical capital ships in full commission, in reduced commission, and in dockyard control for large repairs is shown below. These figures have been prepared for private ships, i.e. other than flagships—

		£
Full Commission	<i>Nelson Class</i>	360,000
	<i>Queen Elizabeth Class</i>	305,000
	<i>Royal Sovereign Class</i>	301,000
	<i>Repulse Class (Battle Cruiser)</i>	330,000
	<i>Iron Duke Class (in reduced commission as Boys' Training Ship)</i>	229,000
	<i>Battleship in Dockyard Control for Large Repairs</i>	6,500

“The figures for an *Iron Duke* class battleship in reduced commission do not include the cost of the boys (First Class) borne for training, amounting to £27,500; those for a battleship in dockyard hands do not include the cost of large repairs, but only that of the naval personnel maintained on board. In connection with this last figure, I should explain that the

¹ *Hansard*, Wednesday, 7th December, 1927.

cost of care and maintenance of a capital ship in dockyard hands for large repairs may vary considerably, according to the extent to which officers and men of the crew are retained for refitting purposes."

These are indeed colossal figures, and I am convinced the public do not realize the drain upon the Exchequer by keeping these huge fortresses, of very doubtful value, in full commission.

My old shipmate and much-valued colleague, Rear-Admiral Beamish, in the debate on the naval estimates of last year, remarked¹—

One sees the old question constantly put, "What is the use of the battleship?" That question is very seldom answered, and I should like to answer it in two or three sentences. The battleship is the highest development of a fighting ship. That is the first and simplest definition. She has become no less efficient in consequence of aircraft having been invented. She is the more efficient, because the Commander-in-Chief knows more of the movements of the enemy than he was able to know previously. The idea that battleships would be sunk or destroyed, dispersed or frightened, or anything of that sort, by aircraft has no foundation in fact, or in experiment. It is not the slightest use putting the cases one hears of in which battleships are moored and a large number of active and keen young men armed with aeroplanes and heavy bombs go up to destroy them. Of course, they can do that, but it is quite another story if a ship is steaming and thoroughly well armed with anti-aircraft guns. I, personally, should feel very comfortable if I were the captain of a battleship thoroughly well armed, and modern, against any number of aircraft.

Now, would Admiral Beamish have been really happy if he had been in command of the battleship *Malaya*, just after the Armistice, when she was attacked with aeroplanes carrying the locomotive Whitehead torpedo, and our airmen secured seven hits out of eight shots, and this ship was not stationary or anchored, but was under weigh!

If hostile aircraft had been attacking this battleship, they would not only have used the locomotive torpedo but rained bombs on her as well; also a few phosphorescent bombs would

¹ Rear-Admiral T. Beamish, C.B., R.N., Member of Parliament for Lewes *Hunsard*, 14th March, 1927, column 1733, 2nd para.

have been dropped to prevent the anti-aircraft guns from functioning.

Admiral Beamish and myself represent two schools of thought. He was a very skilled and most capable gunnery commander. If he had only studied air problems in the able manner he studied gunnery problems, I am confident he would have swung the way I did, and have done everything he possibly could to advance air development. My gallant colleague does not inform us how to use a battleship. He does not answer his own question, but merely acquaints us with what the battleship is!

The whole battleship question is extremely complex and controversial, and merits very close study. When the Washington Agreement expires in three years' time,¹ all the naval Nations who continue to build battleships will be called upon to replace them at tremendous cost. During the debate on the new cruiser programme,² I asked any of my colleagues in the House of Commons who are Admirals or students of naval matters, like Commander Bellairs,³ if they could inform the Committee how we are going to use our twenty battleships in the next war, which may necessitate them steaming some 3,000 miles from their bases.⁴ This is entirely a tactical problem, and, strange to relate, my question was not answered, although I repeated it three times. There is no battleship menace to us in Europe, and if battleships are used in the next war they will have to operate at great distances from our shores.

At one time the battleship had the freedom of the seas. She could go anywhere. She was the most forceful vessel afloat, and was only limited by the necessity of keeping in navigation waters, and giving all shoal waters a wide berth. But with the introduction of the Whitehead⁵ locomotive torpedo, in 1872, we find new conditions being developed, all

¹ 1931. ² 1926.

³ Commander Carlyon Bellairs, Member of Parliament for Maidstone.

⁴ I repeated this question during the debate in the House of Commons on the 1928-9 air estimates, but again failed to elicit a reply.

⁵ *Lupis-Whitehead locomotive torpedo.*

against the movements of the battleship. This new weapon was brought to a high state of perfection in the fast torpedo-boat, then the destroyer, the submarine, and now the aeroplane, coupled with mines that can be laid in certain areas from minelayers and submarines. The poor battleship has her field of operations so restricted by these new and formidable weapons that her former mobility of effective action is negligible. We have been told that no up-to-date battleship was sunk in the late war by a submarine. This is true, as I have always understood the battleship *Audacious* was sunk by a mine, though she has been claimed by a submarine. We are not told very much about the "lame ducks" that could only just be got into port with great difficulty, neither are we given any information about the orders given to the German submarine commanders.

These officers made no really serious efforts against the Grand Fleet. Some attacks lasting a few days in four years were made, and the reason for not making more attacks on our warships is due to the orders they received from superior authority.

We are informed that the rest of the time their orders were to concentrate on merchant ships, and not to attack men-of-war. These instructions did not lack definiteness: "Even if it is your last torpedo," they ran, "it is wasted on a warship, for a merchant ship may turn up just afterwards." They were followed to the letter, and their results are shown in the 6,000 odd ships that were sunk by submarines,¹ the majority at over 1,000 miles distance from the German bases. There can be little doubt that had the Germans concentrated on our warships instead of the ships of the Mercantile Marine, they would have made a heavy toll, and this can best be instanced by a German Zeppelin putting a submarine² on to attack the

¹ See Table of Submarine Sinkings, page 394.

² I have always understood one submarine sank these three cruisers, but I have seen it stated two submarines took part in this feat. My information is that this attack was made by Lieutenant-Commander Otto Weddigen in "U 9" and within an hour the three ships had sunk with a loss of 60 officers and 1,400 men on the morning of 22nd September, 1914.

Aboukir, *Cressy*, and *Hogue*, when carrying out a patrol from our coast into the North Sea. The intrepid Captain of the German submarine sank all three of these 12,000 ton cruisers, costing nearly a million pounds sterling each, and he thereby performed the greatest torpedo feat in history. This was accompanied by great loss of life.

Because the enemy preferred to attack our most vulnerable spot, our food-carrying ships, it does not necessarily follow that modern battleships could not have been sunk or turned into "lame ducks," had the German submarine commanders really concentrated on this objective.

A good illustration of what happens when a battleship is hit by a torpedo is given when Sir Cecil Burney reported at 6.45 p.m., during the Jutland Battle, that his flagship, the *Marlborough*, was struck.

Lord Jellicoe in his book¹ is not quite clear whether the torpedo was fired by a battleship, destroyer, or submarine. But he is quite clear that she was turned into a lame duck, by recording that—

At 2 a.m. on 1st June Vice-Admiral Sir Cecil Burney informed me that the *Marlborough* could not maintain the Fleet speed of 17 knots any longer on account of the stress on the bulkheads and that she had been obliged to ease to 12 knots. I directed him to order the ship to proceed to the Tyne or Rosyth, passing south of the German mined area.

We have also been informed that no battleship has been sunk in war-time by a bomb from the air. This is quite true, but the United States Naval and Air Department recently made a series of experiments which are of very great interest.

The first target was "W 117," an ex-German submarine; three flying boats attacked her, each carrying three 180 lb. bombs. The submarine was cut in two and sank. The second target was the ex-German torpedo destroyer "G 102," one of the largest vessels of this class, and successfully used by the Germans in the Great War.

¹ *The Grand Fleet*, page 356.

General Mitchell¹ tells us the air attack was beautiful to watch; the accuracy of the bombing was remarkable, practically every bomb went where it was directed, the decks of the destroyer were punctured and swept from end to end. Lieutenant Alsworth put one bomb straight down one of the funnels, which undoubtedly would have blown up the boilers.

In less time than it takes to tell their bombs began churning the water around the destroyer. They hit close in front of it, behind it, opposite its side and directly in its centre columns of water rose for hundreds of feet into the air. For a few moments the vessel looked as if it was on fire, smoke came out of its funnels and vapour along its decks. Then it broke completely in two in the middle and sank down out of sight.

The next target was the cruiser *Frankfort*; at first, to see the effect, and not wishing to sink the target at once, 100 lb. bombs were used, then 300 lb. bombs, then a 600 lb. bomb. After being struck with a 600 lb. bomb, she listed over to port, her bows submerged, and she then slid out of sight under the surface of the water. This proved that a bomb could sink a cruiser.

Another target was the German battleship *Ostfriesland*. This battleship was specially designed and given much subdivision below the water-line, so as to resist torpedo attacks when operating in the North Sea. General Mitchell informs us that during the first experiment—

It was desired, however, to observe the effort without sinking the ship, so only one 1,100 lb. bomb was dropped at a time.

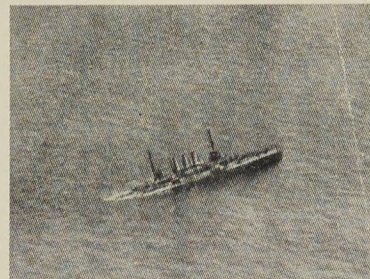
“Then 2,000 lb. bombs were used. Four bombs hit in rapid succession close alongside the *Ostfriesland*. We could see her rise eight or ten feet between the terrific blows from under water. These bombs explode with so much force that even a near miss at some distance from the ship is enough to loosen the rivets in any ship and cause leakage.”

On the fourth bomb being dropped, at 12.30 p.m., the bow

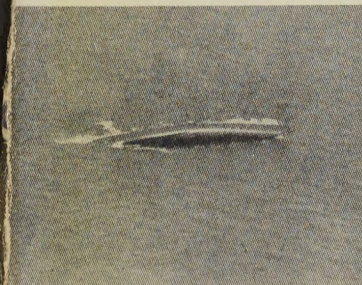
¹ *Winged Defence*, by General Mitchell, former Assistant-Chief of the Military Air Force, U.S.A.



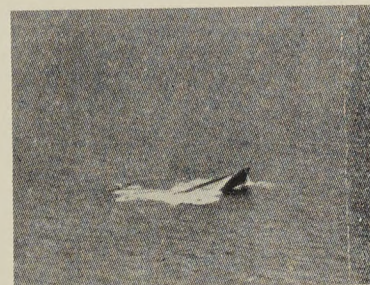
THE FIRST 2,000-POUND BOMB HITTING
THE GERMAN BATTLESHIP
"OSTFRIESLAND"



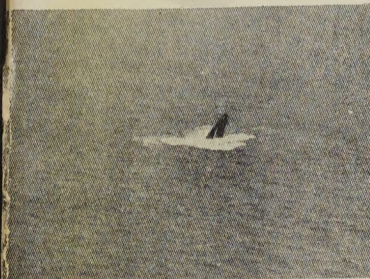
STARTING THE FINAL PLUNGE
12.37 P.M.



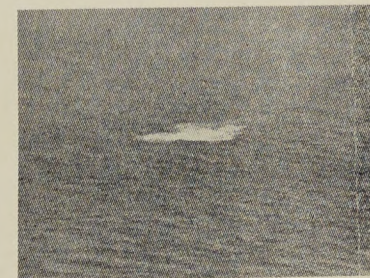
LYING ON PORT SIDE
12.38 P.M.



TAKING THE FINAL PLUNGE
12.39 P.M.



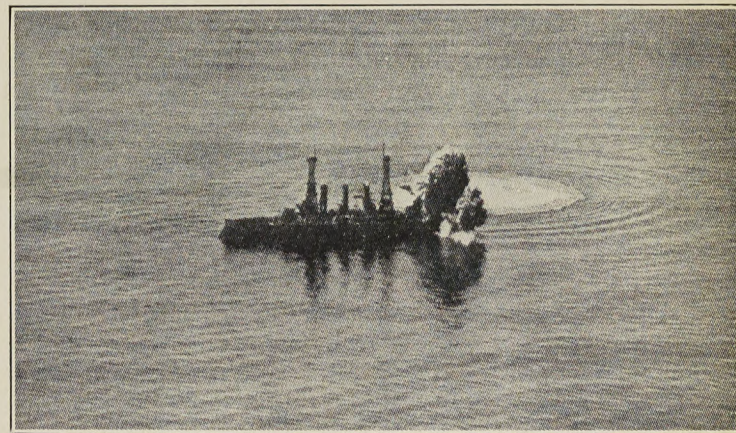
BOW UP 12.39½ P.M.



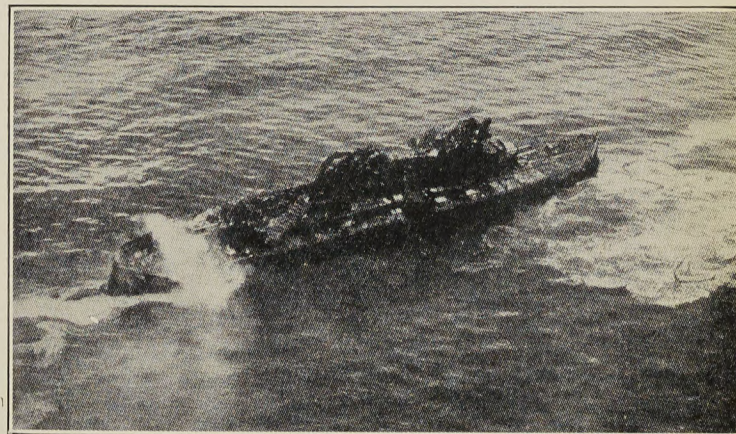
TOTALLY SUBMERGED 12.39¾ P.M.

BOMBING THE BATTLESHIP "OSTFRIESLAND"

(The Saturday Evening Post)



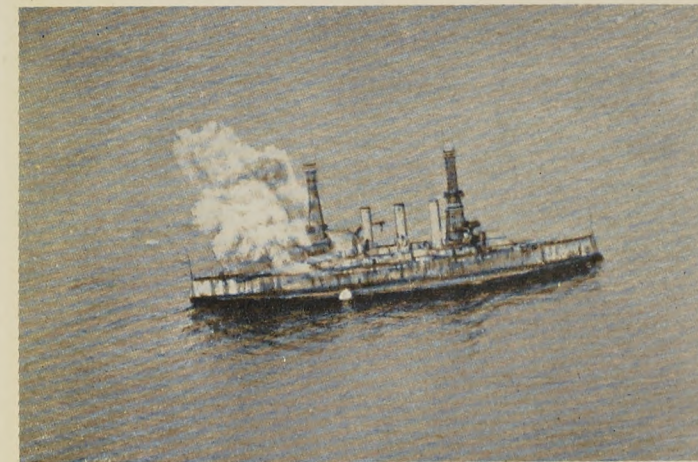
THE U.S. BATTLESHIP "VIRGINIA" WHEN HIT WITH A
1,100-POUND BOMB



"VIRGINIA" FORTY-EIGHT SECONDS AFTER BEING HIT
BY THE 1,100-POUND BOMB

ALL BATTLESHIPS, NO MATTER HOW EFFICIENTLY CONSTRUCTED, CAN BE
TURNED INTO "LAME DUCKS" BY AIR BOMBS IN A SHORT TIME

A DIRECT HIT IS NOT NECESSARY—A NEAR MISS WILL SUFFICE



U.S.S. "NEW JERSEY" WHEN HIT WITH A 1,100-POUND BOMB



"NEW JERSEY" AFTER BEING HIT WITH A 1,100-POUND BOMB—
BOTTOM UP

From "Winged Defence," by General Mitchell

was up and the stern under water. At 12.37 she was lying on her port side ready for the final plunge ; at 12.39 the bow was in the air at an angle of 35 degrees to the horizontal ; at 12.39½ she was nearly vertical, and at 12.39¾ Captain Street, sitting in the back seat of General Mitchell's plane, stood up waving both arms, and said " She is gone " (see Plate 19).

It took only a few minutes to sink that battleship.

The American flyers then bombed the battleship *Virginia*, and in forty-eight seconds she was a total wreck (Plate 20). The *New Jersey* was hit with a 1,100 lb. bomb, and soon turned bottom up (Plate 21).

In shoal water the explosive effect would be greater than in deep water, but all torpedoists know that even in deep water a 2,000 lb. bomb would put the most modern battleship out of action if a direct hit or a near miss were obtained by an airman. If a direct hit, the holocaustic effect would be tremendous, and the rushing and tearing would be beyond belief. In a near miss, the water projectile would penetrate the bottom, loosen the rivets, and the lift, causing an anti-climax, would be enormous. When the *Ostfriesland* was hit by the 2,000 lb. bomb the bow was lifted up many feet and the stern submerged. Again, our critics may say that there is the counter-attack, that aircraft will go up from the fleet and will knock out all these other aircraft. But if you are working on an enemy's coast, as you would be, they could put up 1,000 aircraft to your 10, because you can only carry a relatively few machines in the aircraft carriers¹ that would accompany the battle fleet, and only launch all of them very slowly.

Many critics, such as my colleague Admiral Beamish, will say the United States targets were stationary ; that is so, but with modern sights and a large number of aircraft attacking—the whole essence of air attack is numbers—the poor battleship would find it exceedingly difficult to escape being hit or

¹ The latest United States aircraft carrier *Lexington* is designed to carry 106 aeroplanes. Her displacement is 33,000 tons and her designed speed 33 knots.

straddled in a hail of bombs. It is not even necessary to get a direct hit. A near miss is probably better than a direct hit, if dropped within 30 or 40 ft. of the side of a ship and the delay-action fuse arranged to detonate the explosive charge at a depth of 50 ft. or so. With efficient sights, the airmen would have no difficulty, when attacking in numbers, to obtain some hits or near misses on a battleship, whether going at full speed, zig-zagging, or any manoeuvres she cared to perform.

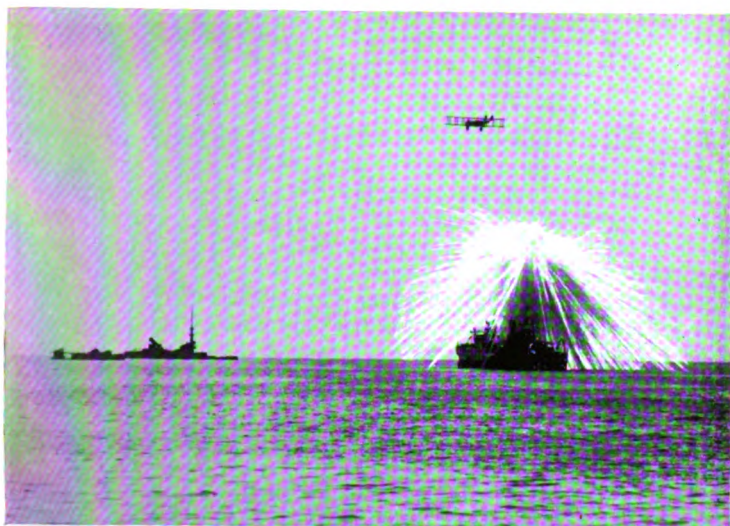
In some further experiments carried out in the United States Navy, Admiral Mark Kerr, who is a skilled pilot and one who has for many years studied air problems, informs us¹ that—

The battle fleet was sent to sea with orders that if a smoke-screen was dropped from the air the formation of the fleet was to be broken up in order to reduce the target offered to torpedoes. Air scouts found the fleet and wirelessly in their position. High-flying aeroplanes came out and dropped a smoke-screen on either side of the battle fleet, which broke up its formation. A few seconds later low-flying torpedo aircraft arrived, and, taking their bearings by the mastheads of their targets, seen over the smoke-screen, and without passing through the latter, they fired blind, and 41 per cent of hits were registered without the battleships ever having seen their attackers. Some time later aircraft of the R.A.F. attacked a British squadron in a fog in the Channel, and scored 7 hits out of 8 shots.

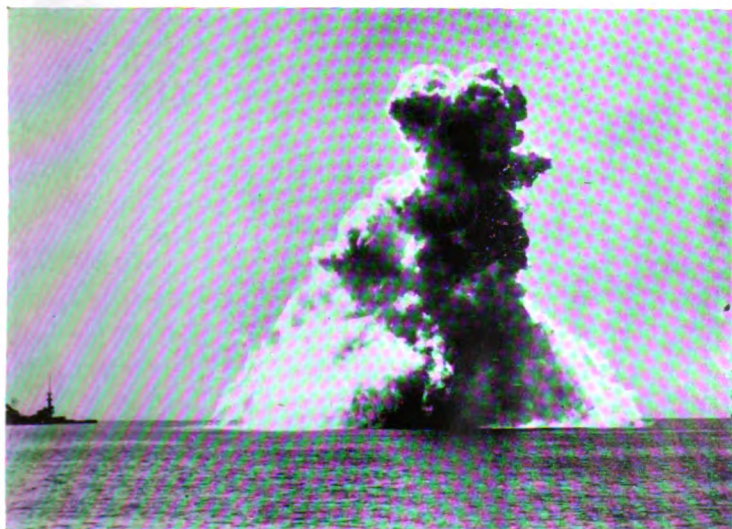
This attack by our airmen on our own ships shows the value of torpedo-dropping aircraft.² Again, my critics may ask: "Where were the anti-aircraft guns, and were they firing?" I have a picture of a phosphorus bomb which was dropped on the *Alabama*, and if any person will look at the result of this phosphorus bomb, and tell me that any anti-aircraft gun can function, I shall be very much surprised (Plate 22). Anti-aircraft guns have very limited value against aircraft if the aircraft are handled properly and drop the right bombs.

¹ *The Morning Post*, 16th June, 1927.

² *The Times* special correspondent with the Atlantic Fleet informs us in their issue of 26th March, 1928, that in an air attack recently made by Blackburn "Darts" carrying torpedoes, six were dropped and four hits obtained. The ship attacked was under weigh and swinging rapidly to avoid them.



A PHOSPHOROUS BOMB HITTING U.S.S. "ALABAMA"



FOUR 100-POUND BOMBS HITTING THE "ALABAMA"

In support of my views on the limited value of anti-aircraft guns against aircraft, I would quote the following—

Speaking in the United States, Admiral Sims said :

It has been said in the past that the battleship was the backbone of the Fleet, but I believe it is so no more. A battleship has no defence against an aeroplane but small anti-aircraft guns. On the Western Front one hit in one thousand was considered a good average, with massed batteries firing at a plane, with plenty of observations to determine the range. The best experts now agree that the results of anti-aircraft firing from a ship are negligible. In my judgment, it matters little whether the big ships now in the world navies are scrapped or left as they are, because in any case they will be of no further use.

Further, towards the end of his address, the Admiral was asked by one of his auditors : " Will the battleship become obsolete against the aeroplanes ? " to which he unhesitatingly replied " Yes."

The reader, I feel certain, would prefer the considered opinion of Admiral Sims, one of the greatest Admirals of our day, before that of " Neon," who states¹—

Very great importance is attached to anti-aircraft by the U.S.A., for the anti-aircraft gun is a weapon which is always on the spot, which is never out of commission, and which will furnish very effective protection against a bombing plane.

Why does " Neon " ignore the opinion of Admiral Sims ? He was the President of the War College of the United States, and his opinion is of great value amongst all thinking men.

The views of General Mitchell, Assistant Chief of the United States Military Air Services, and the very able Commander of all the American Air Forces in Europe during the War, should carry weight. They are—

During the War anti-aircraft artillery brought down about one-tenth of one per cent of our airplanes that were fired at. The great difficulty about hitting anything in the air is that there is no point of reference up there—no tree or church steeple, road crossing or hill on which fire may be adjusted. It is difficult enough for field

¹ *The Great Delusion*, pages 228-9.

artillery to hit comparatively small targets on the ground at any range over five or six thousand yards where there is an opportunity to range and to correctly observe the fire.

As a matter of fact, the exact distance and speed of a plane are practically unknown to the artillery-man and it is extremely difficult for him to determine these factors.

The idea of defending the country against air attack by machine guns or anti-aircraft cannon from the ground is absolutely incapable of being carried out.

Other naval officers have criticized the provision of battle-ships, for did not Admiral Sir William Grant,¹ in a letter to the *Evening Standard*, discussing the results of the Washington Conference, write—

By most people who have studied the subject and by most naval officers the usefulness of capital ships is regarded as problematical under existing naval and international conditions and as still more problematic ten years hence.

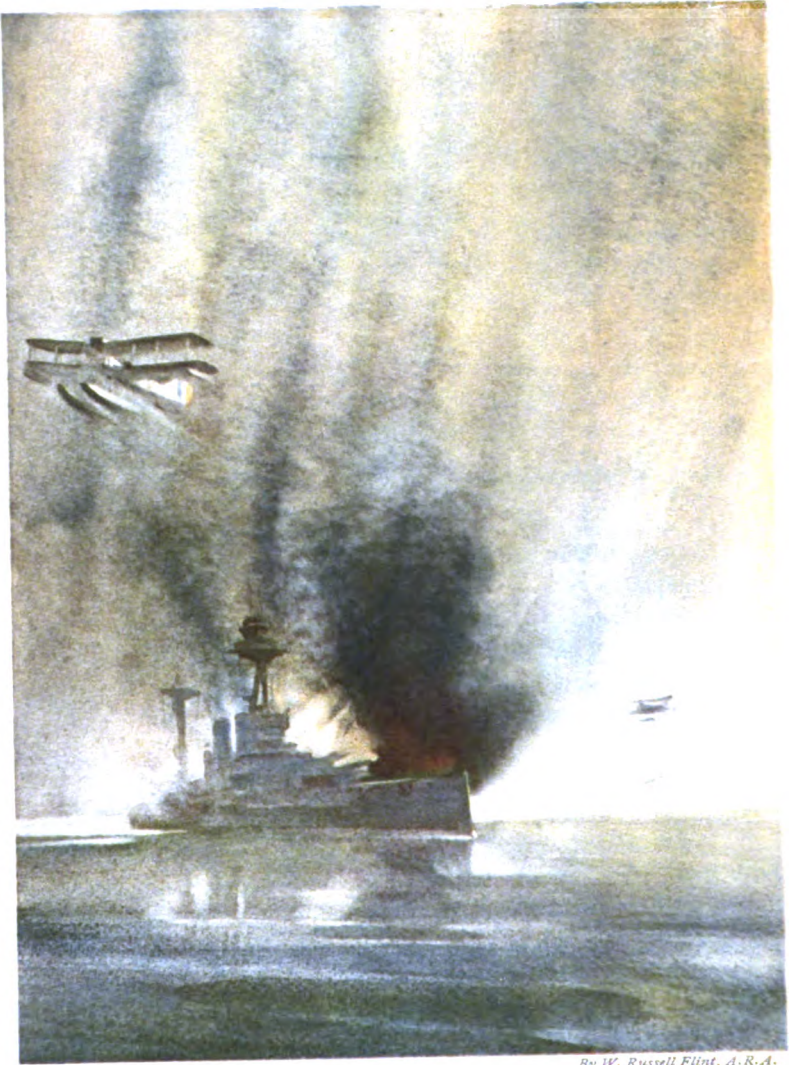
Their retention appears to be due to a sort of megalomania and desire for window dressing.

When the new Commonwealth cruiser *Australia* was recently launched,² Vice-Admiral Sir Alfred Chatfield is reported to have said: "If the people of this country once got it into their heads that the battleship was no longer of any use, then the security of our trade routes and of the Dominions would vanish." The gallant Admiral will, I know, forgive a little criticism.

Does he mean that the battleship is really necessary for the guardianship of our 80,000 miles of trade routes? He cannot think that she would be directly employed in this duty, but her function would presumably be to protect the very fast cruisers that should be available for protection of our great

¹ Formerly an assistant to D.N.I. and Commander-in-Chief China and North American Stations.

² Admiral Sir Alfred Chatfield is one of the most able gunnery flag officers in the Navy. I would ask him to put his good brain into this battleship problem and view it from the taxpayers' point of view, who now has to shoulder the burden, as Lord Cecil of Chelwood reminds us, of paying fourteen shillings out of every pound of taxation due to past wars or the preparation for future wars.



By W. Russell Flint, A.R.A.

THE DOOMED BATTLESHIP

Seaplanes attacking with the Whitehead Locomotive Torpedo, after
Placing the Battleship under a Smoke Screen

sea routes. Surely the battleship is not intended to chase hostile cruisers of greater speed than herself! That would indeed be a waste of millions of the taxpayers' money.

Admiral Chatfield could chase hostile fast cruisers with battleships for ever, but I fear our trade routes would soon be sorely depleted of thousands of tons of shipping if his advice was taken.

Admiral Mark Kerr wrote in March 1927—

Economy must be made in the other Services in order to keep command of the air. The present type of mammoth ship is still as purposeless as, and even more vulnerable than, in the last two years of the Great War, when the great flotillas of the underwater, surface, and air had come into their own.

The point I want to make is that battleships operating a long distance from their bases are now perfectly out of date. If they approach within 300 miles of an enemy's coast, and to be effective they must do so, they would be attacked by fast surface craft carrying locomotive torpedoes, destroyers, submarines, torpedo, and bomb-dropping aircraft, minelayers, and submarines dropping mines in certain defined areas where the battleships would have to operate (Plate 23). I will not go so far as the late Admiral Sir Percy Scott did, when he put up the midshipman to say, in answer to the question: "What is the use of a battleship?" "It is no damned use." These battleships have, in my opinion, only a slight potential value, and I am quite willing to concede that the most modern battleship can, no doubt, be constructed to the design of our very able naval constructors so as to be almost, if not quite, unsinkable. But if a battleship is hit by a locomotive torpedo, whether fired from a submarine or aeroplane, or if hit, or nearly hit, by a large air bomb dropped from an aeroplane or seaplane, she will, if she does not sink, be so damaged as to become a lame duck,¹ and will no longer be able to keep her place as an effective unit in the firing line. She will then become, particularly at night or between the lights, a prey to all the torpedo

¹ See page 73, damage to battleship *Marlborough*.

attacks I have mentioned. In any case, battleships have limited sea-keeping endurance, and cannot operate at long distances from their bases for any length of time, and that is a tactical fact that the most ardent advocate of "Backbone of the Fleet" battleships cannot dispute. The late Admiral Sir Percy Scott would have succeeded in his great effort to delete the battleship from the navies of the world had he not over-painted the picture, and he should, if I may say so with great respect for his very high professional attainments, have approached this big problem from the more tactical point of view. If he had been less arbitrary and more serious in the way he attempted to force his opinion on his countrymen, he might have been more successful. From whatever angle the battleship is considered, there can be one, and only one, opinion, and that is that modern weapons have so reduced her effectiveness that she has only a slight potential value, and, as the centre of naval strategy has now shifted from the North Sea to the Pacific, her value in not being able to operate for any length of time over great distances has become proportionately lessened.

In my judgment, it is absurd to keep battleships in commission that cost many millions per year on their upkeep and will cost still more millions to replace when they have only a slight potential value.

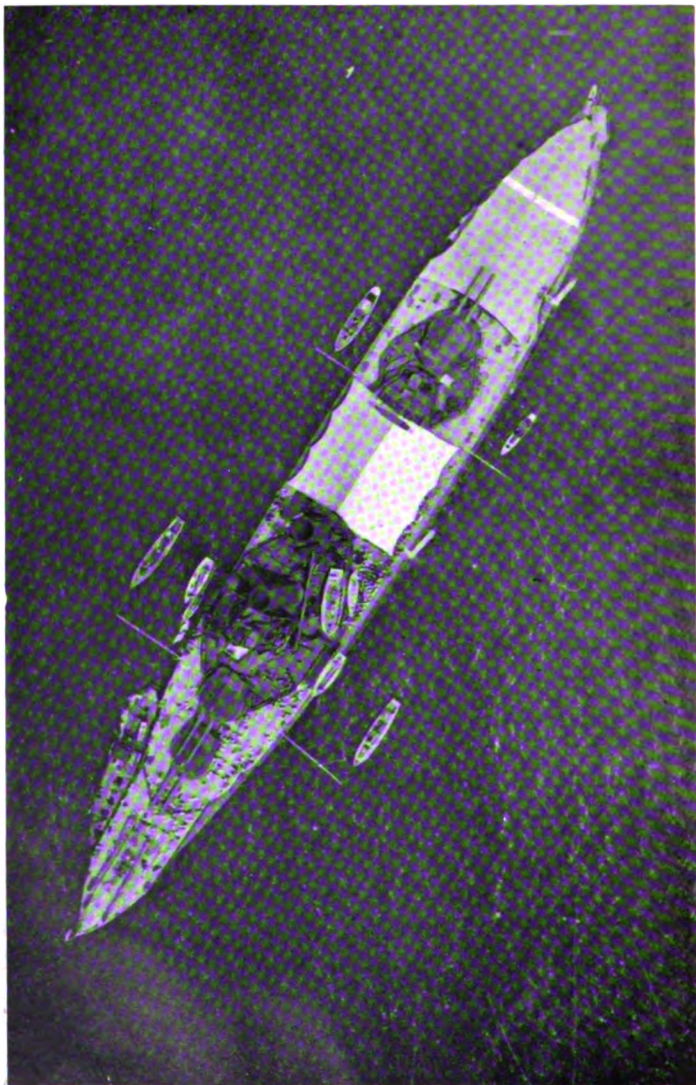
As I have mentioned, the modern battleship, costing seven million pounds, is not only the most expensive unit to construct, but, as shown by the figures already quoted, most expensive to maintain. The *Nelson* and *Rodney*¹ cost nearly half a million each per annum to keep them in full commission.

A battleship necessitates cruisers, destroyers, and aircraft carriers attached to the fleet of which it forms a unit. The very existence of a battle fleet weakens our cruiser position, as it locks up so many that would be needed for trade protection.

The battleship is quite unsuitable for protecting commerce ; it is equally unsuitable for attacking commerce. The battleship

¹ See page 68.

PLATE 24



THE FIRST PHOTOGRAPH OF A BATTLESHIP TAKEN FROM A NAVAL AIRSHIP
Spithead Review, 1914

is the aggressive unit, and I feel certain that many big-brained Englishmen and Americans will soon see the doubtful wisdom of providing seven million pounds and over for the construction of these floating fortresses that have only a slight potential value.

Approaching the battleship question from another angle, we are told that the function of the capital ship is to disable the fighting ships of the enemy. It is quite obvious they cannot engage cruisers of higher speed. Then they must engage other capital ships, and the question naturally arises : Is it necessary to have such great ships as the 35,000 ton displacement battleship ? Why would not a 15,000 ton ship with a 12 in. gun do ? If that is acceptable, why not a 10,000 ton Washington cruiser, with an 8 in. gun for the largest naval unit ? Tonnage is a relative matter, and largely determined by the gun it is proposed to carry and in what number.

The submarine and aircraft welcome a big target as being more easy to hit. If hit, the largest ship can be turned into a lame duck, so it is not quite clear on what grounds the giant ship is developed, and there seems no real necessity to build 35,000 ton battleships that cost over seven million pounds each.

It is often stated that the huge battleships are required to resist modern weapons. Looking at this argument from a torpedoist's point of view, will the reader glance at Plate 24, please. This shows the first photograph of a British battleship ever taken from a British airship, when manoeuvring over the Fleet at the Spithead Review of 1914.

This was a smaller battleship than the seven million pound battleship of the present day. If her dimensions are increased it is quite obvious she is a bigger target to hit with bomb and torpedo-dropping aircraft. Also she is a larger target for submarine attack.

There is every argument for abolishing battleships by agreement with the five chief naval powers, and adopting the 10,000 ton Washington cruiser as the largest naval unit. No good can come of one school of thought slinging bricks at

those who may differ from them. The battleship problem is admittedly controversial. The new 8 in. gun is supposed to be superior to the old 12 in. gun. Why should not that gun be made by agreement the largest gun mounted in a warship.

If this were done, a seven million pound floating fortress would not be required and the 10,000 ton Washington cruiser would suffice.

With regard to cruisers, the problem for us is different to that presented to other nations, for we have to defend some 80,000 miles of trade routes, and prevent any of these great arteries from being cut by a hostile force.

Mr. Bridgeman stated in Command Paper No. 2964—

No one could have put the case more clearly than did Mr. French, Chairman of the House Naval Committee, in presenting the Naval Estimates in the American House of Representatives on 4th January last: "Stop the lanes of the sea to the ships of Great Britain and suffering would be brought to the people of the British Isles within a period of weeks . . . Turn to the United States. Our country could be cut off from the rest of the world and there would be food for our people; there would be fuel oil for our use; there would be materials of all kinds for our service. The lanes of the seas might be closed to us for weeks or for years. Should the necessity arise, the United States within her own territory, could sustain her people without suffering, and could produce the material to meet whatever emergency naval necessities might require."

The main purpose of the British Fleet was clearly defined in an admirable Admiralty Memorandum issued in 1910, in which it stated—

The really serious danger that this country has to guard against in war is not invasion but interruption of trade and destruction of our mercantile marine. The strength of our Fleet is determined by what is necessary to protect our trade.

In the opinion of many modern naval officers, battleships are not required for trade protection, and I am confident that many Admirals will agree with me that with the German Fleet out of the way, three fast cruisers, costing two and a third millions each, are of greater value to this country than one battleship costing seven millions.

Many of our cruisers are becoming aged, and need replacement by more modern types. Mr. Ramsay MacDonald, when Prime Minister, in spite of considerable opposition from his own party, in a fine, statesmanlike speech, faced the question fairly and squarely when he said in the House of Commons: "We could not let the Navy rot from bottom to top, and the Socialist Government would, whilst welcoming universal disarmament, lay down five cruisers for the replacement of the older types."

Since then, Mr. Bridgeman, our astute First Lord of the Admiralty, has carried with considerable ability his cruiser programme through the House of Commons. The naval authorities in the United States are in exactly the same position as ourselves. Their cruisers are wearing out, and Mr. Wilbur no doubt had his old armoured cruisers of low speed and obsolete guns in mind when he stated in his recent report that

The Navy was not precisely fit for the scrap heap, but not fit for much more.

The only modern cruisers in the United States Navy are the ten ships of the *Omaha* and *Pensacola* classes. These have a speed of 34 knots, and the latter are of 10,000 tons displacement.

The 1928 Bill placed before the House of Representatives, provides for fifteen 10,000 ton cruisers with 8 in. guns, and for an aircraft carrier of large displacement to be built within six years. This is a tremendous reduction on the original proposals of the War Scare School.

In considering these costly replacement problems, we must remember that every nation has a perfect right to take the precautions deemed necessary for her defence, to maintain her sovereign rights and protect her nationals in all parts of the world.

But the question of the numbers in any particular unit must naturally depend on what the other nations are doing, for example, in the way of maintaining a large or small navy.

In speaking on limitation of armaments at last year's Royal Academy Banquet,¹ Lord Jellicoe said—

Were I asked to advise on the subject of disarmament, I would say: "Limit the size of your ships: arrive at some limitation of the size of vessels." One of the greatest mistakes that was made at the recent Washington Conference, in my opinion, was placing the size of cruisers at 10,000 tons. That immediately put nearly every British cruiser on the obsolete list, and it enforced a standard of 10,000 tons for every cruiser built in the future. There is no reason whatever why a much lower limit should not be settled upon. And perhaps there is also an opportunity for economy in the question of administration.

All thinking people were grateful to the President of the United States for convening the Washington Conference, which resulted in the chief naval nations being limited to a definite ratio in battleships. This prevented an insane race in capital ship construction, and relieved the taxpayers of those nations from expending many millions on vessels that have been rendered, by the development of the Whitehead locomotive torpedo, when used from surface, underwater and air craft, almost useless, that is, they have now only a slight potential value.

Under the terms of the Washington Conference, which we are faithfully observing, no more battleships can be built until the period has elapsed. But we must remember, and I repeat it, the taxpayer has to pay nearly half a million every year for the upkeep of every modern battleship kept in commission, and there is much to be said in favour of the abolition of the battleship by agreement between the chief naval powers.

Recently the Geneva Conference on the limitation of naval armaments has been held, and adjourned *sine die*, as no agreement could be reached on the question of reducing naval expenditure and other important points brought forward by the United States, Japan, and this country. President Coolidge's message to the delegates requested them to come to an agreement "rendering impossible any form of naval competition between the three powers." Mr. Hugh Gibson, the Chairman

¹ 1927.

of the Conference, in dealing with the President's message, made the following points—

1. Elimination of competitive warship construction.
2. Eliminate aggression and consider security and defence.
3. Economy in naval expenditure.

Mr. Bridgeman, the First Lord of the Admiralty, desired to reduce the tonnage of battleships,¹ but the United States delegates were not in favour of discussing in much detail the capital ship question, so it was shelved and the deliberations were confined to cruisers, destroyers and submarines.

We desired two distinct classes of cruisers, the 10,000 ton, armed with 8 in. guns, and those ranging from 6,000 to 7,500 ton displacement, with a 6 in. gun armament, and also asked that destroyers and submarines be divided into two classes.

Agreement on gross tonnage did not appear to be a very great difficulty. The final cause of disagreement was publicly stated to be the question of 8 in. guns for the smaller cruisers, as desired by America.

But to my mind, this was a secondary point compared to a decision being come to on what are the needs of defence for the different naval powers.

The whole question of a nation's needs with what is necessary for defence to give her adequate security is one of great difficulty, and clearly rather beyond a conference of this nature. It can only be dealt with by the chief statesmen of the nations concerned, and the peoples of the respective countries must express their general desire before large decisions in regard to national defence are taken. I think Mr. Bridgeman and his naval colleagues were wise in not pressing for a decision at this stage.

Some little time must now elapse before another naval disarmament conference is called. In the meantime we can only hope that wiser councils will prevail in France and Italy,

¹ In March, 1928, at Geneva, Lord Cushendun proposed to the United States, France, Japan, and Italy that the tonnage of future battleships should be reduced from 35,000 to 30,000 tons. But this small reduction will not, I imagine, satisfy the taxpayers of the naval nations. Many of them would like total abolition of capital ships by agreement.

and that they may see their way to take further action with the three powers that assembled at Geneva to ascertain if some further limitation in naval armaments could not be achieved. Only prejudiced people can doubt the real sincerity of America, France, Italy and Japan in their desire for peace. We may have our minor differences, but I feel confident the Allies desire with all their hearts to spare future generations from the horrors of war, as they have known them.

Mr. Bridgeman also informs us in Command Paper No. 2964 that since the War—

We have scrapped a very large number of warships, amounting to a tonnage of the enormous figure of 1,797,000 *tons in battleships, cruisers and destroyers*, in the interest of limitation.

Most people will agree that in this country we have disarmed to the limits of national safety, in all three branches of the fighting services. This is what the covenant of the League of Nations enjoins us to do, and we have faithfully carried out our obligations to that body. To keep the freedom of the seas, we cannot dispense with our navy any more than we can with our police force. The world is not ready for complete disarmament, and in my opinion never will be. The question then arises, can we disarm further? This we cannot do without agreement with the chief powers. "Safety First" must be insisted upon by our people when our statesmen are dealing with all questions of national defence. America has informed us in plain words at Geneva that she is desirous of absolute equality with the British Empire in battleships, cruisers, aircraft carriers, destroyers, and submarines. We have not the slightest objection to this, and, as far as I know, neither Mr. Bridgeman nor his very able naval advisers, Admiral Field and Admiral Pound, or any other of our statesmen, have ever raised any objection.

But what most people in this country took strong exception to was the attempt made by the United States delegates to lay down what standard of strength in cruisers should be maintained by the British Empire, and I think Mr. Bridgeman was quite

right to demur at the attitude taken up by the United States. The parity principle needs clear elucidation, but its interpretation should not always be against the interests of the British Empire. All we ask for is a square deal when these naval disarmament proposals are being deliberated upon.

We are prepared, as shown since the War, to make great sacrifices in the cause of peace, but there must be some limit, and we cannot court disaster by crippling the security of our 80,000 miles of trade routes that are vital for the needs of our people, as at any given moment we never have much more than six to seven weeks' food supply in this country.

It has been aptly said we must keep the "bread line" open, or, as our American cousins call it, the "feed line."

Also, Japan is by no means as self-contained as most people imagine, and has to bring into her country nearly three-quarters of a million tons of rice annually to feed her people. She is also deficient in oil fuel and iron for war purposes to ensure her security and to keep the pipe lines of supply open from Manchuria and Mongolia.

The people of the United States are practically free from any dependence on ocean-borne food and other necessary commodities. Their condition is totally unlike that of the island nations. The chief commodities they have to import are tin and indiarubber.

They have some coastal and ocean commerce to protect, but nothing compared to what we have to undertake. In addition to having to feed our people, we have vast world responsibilities, whereas the United States world responsibility is large, but not so great as ours.

Consequently, the Americans can concentrate all their efforts on a war fleet whereas we have, in addition to our war fleet, to develop a special type of cruiser or cruisers for the protection of our commerce and gunboats for special service in different parts of the world.

The problem for us is difficult, and the people of the United States may realize the difficulty when they remember it took

forty ships to hunt down the *Emden* that was raiding our commerce in the East Indian waters.

There is no doubt about the "big naval drum" being beaten in America. Almost every paper comments on this subject. In my judgment this is most unfortunate. Particularly when scientific American naval officers take part. May I quote one? Rear-Admiral Bradley Fiske, U.S.N., speaking in November, 1927, is reported to have predicted—

The seizure of the Philippines by Japan, instigated by Great Britain and supported by her—with the American base 7,000 miles away—the situation will be ideal for the use by Japan of submarines and aeroplanes. Meanwhile, perfidious Britain will be selling both sides and again become Mistress of the Seas and American debtor nations will make a use of their opportunity to force the cancellation of their debts.

Now, Admiral Fiske is an officer who is well known; he was working upon torpedo-dropping seaplanes when I was doing the same in this country. He will forgive, I know, a brother naval man being quite frank, when I say: Admiral, this simply will not do! For did not the New York correspondent of the *Daily Telegraph* cable in May, 1920, to this country—

Rear-Admiral Fiske, an officer of world-wide repute, considers that had the President's advice to "throw prudence to the winds" been taken, victory for the Germans would have followed. Prudence, he maintains, was essential; and it was this quality, combined with and restraining sheer audacity, that finally won the War.

It is perfectly true, as he says, that the Germans desired nothing more ardently than that we should pursue a course of desperation. Had we done so, "England might have been invaded and America left with no dependable protection against the menace of the German Fleet."

Admiral Fiske concluded with this remark—

It is the prudence of the British Admiralty standing firm against the advice to dig the rats out of their holes, that the American people owe their protection from invasion.¹

Comment on the gallant Admiral's opinion in 1920 and 1927 is unnecessary, but I do say, with great respect to him, that

¹ From *Naval and Military Record* of 26th May, 1920.

I think he would be rendering a greater service to our two countries if he would put his good brain into the problem that arises from the sea policy of his own country, as a neutral in a war in which Great Britain is a belligerent. I admit it is a difficult problem. But difficulties were made to be overcome, and I submit this one should be faced, as it is not the tradition of our two great countries to run away from a serious question. If we allow this matter of the United States desire to re-write maritime law and the law of nations when other nations are at war and she is a neutral desirous of carrying contraband to drift on without settlement, it may one day become a question of some magnitude between our two countries.

It is well known in this country that some of the American Statesmen are advocating that the United States would be quite right to ignore a blockade when other nations are belligerents and America is neutral, and openly say the United States warships must have free and undisturbed right to navigate the high seas. In the February¹ number of *McCall's Magazine*, Colonel House discusses this subject. He states that "by the simple device of bringing agreement regarding the abolition of capture and search at sea, the question of naval disarmament almost solves itself. He adds—

The attitude of Great Britain is the main obstacle to its being brought about, as the other powers would not object to Great Britain having as large a navy as is necessary for protection from invasion, provided it were not used to blockade enemy ports or interfere with enemy or neutral commerce in time of war.

I would press most earnestly that the Governments of the United States and Great Britain should at an early date appoint a Commission to examine our maritime law differences.

In the *Morning Post* of 23rd January, 1928, we are informed that Rear-Admiral Charles Plunkett, Commandant of the New York Navy Yard, one of the senior officers of the United States Navy, when speaking before the Republican National Club in New York on 22nd January, dealt with naval armaments, and

¹ 1928.

after the meeting he was asked if he anticipated war with Great Britain. Without a moment's hesitation, he is reported as answering—

Yes, I mean Great Britain or some other Nation whose interests are affected. Great Britain may not at the outset declare war, but she will let some smaller Nation do that and then get behind her.

In my judgment, those who attempt to sow discord between Great Britain and the United States are enemies to the whole civilized world.

Mr. Borah, the Chairman of the United States Senate Foreign Relations Committee, says, "these wild and excited statements about war are sheer madness."

Words of great sincerity were spoken by Mr. Asquith in the debate in the House of Commons in August, 1921, when I made my maiden speech advocating abolition of battleships.

Mr. Asquith said: "War between this country and the United States of America was unthinkable." The recent sensible act of Mr. Bridgeman in postponing the construction of two of the three cruisers of this year's naval programme, with the possibility of the third cruiser being also postponed, will be welcome to most of our people, not only as an indication that a cruiser armament race with the United States is not in the mind of the Government, but as the best contribution to peace that has been made since the Washington Conference.

This action of the Admiralty will have far-reaching results, and do much to combat the efforts of the "Big Bang Party" in the United States that is trying to create Anglo-American naval rivalries when they would be rendering a much greater service if they advocated a better understanding between our two countries. Mr. Bridgeman's fine, statesmanlike action in reducing his cruiser programme has won the admiration of all those who sincerely desire further limitation of naval armaments by agreement between the chief maritime powers, and undoubtedly he can take credit, in no small measure, for the very large reduction now made in the United States new cruiser programme.

Although we may congratulate the League of Nations in making all countries think more in terms of peace than hitherto, and admire them for being quite up to date in their desire to develop high-speed air travel, and have their own special aeroplanes to enable League business to be conducted with greater rapidity, most thinking people in this and other countries are a little disappointed that the League has been able to achieve so little in the way of limiting armaments, and many cordially agree with the action taken by our Australian representative during the debate on the plans for the new League building, when Sir Granville Ryrie, High Commissioner for Australia, accused the Assembly of wasting too much time in idle talk when he said—

“ I came to Geneva expecting to see something definite being done towards assuring peace, but instead we waste hours discussing the type of proposed new home for the League.

“ I hope the President will pull me up if I am going too far,” he said amid laughter, “ but my advice is to get on with the job.”

Since the Armistice, our advance in the direction of security, arbitration, and disarmament, as Viscount Cecil of Chelwood rightly points out, has not been great.

I regard the limitation of armaments as the most important question of the day, and for some years I have been advocating that the great success of the first Washington Conference in limiting battleships can be extended, and I again make a strong plea to Mr. Coolidge and Mr. Baldwin jointly to convene another Conference before 1931, to be held at Washington, and consider the following points—

Abolition of battleships by general agreement among the chief naval nations ; make the Washington 10,000 ton cruiser the largest naval unit of modern navies, each nation being allowed a ratio in accordance with her needs for security, protection of trade, and world responsibilities.

The United States must surely recognize how Japan and this country differ from their requirements in these two last items.

Allow nations to build as many 5,000 to 6,000 ton cruisers

as they desire for purely police duties, limit destroyer and submarine tonnage to each nation's defensive needs, maximum dimensions and radius of action of each destroyer and submarine unit for fleet work and coast defence to be clearly laid down ; appoint an International Conference under the League of Nations with instructions to draw up concise regulations for governing all phases of submarine warfare.

I firmly believe the citizens of the chief maritime nations would all feel relieved if a formula of this nature could be accepted.

When I first put forward these disarmament proposals in the Press, Rear-Admiral J. D. Allen wrote to a Hertfordshire paper, and in commenting upon them said : " This message cannot be repeated too often. No truer or wiser words were ever written." This was very fine support from a brother officer who possesses very high scientific attainments in the torpedo branch of the British Navy.

Lord Cecil of Chelwood, speaking on the 21st October, 1927, said—

Do not let us forget that out of every pound of taxation we pay, fourteen shillings is due to past wars or the preparation for future wars. Eleven shillings of that, pensions and payment of debt, has been already incurred. Putting aside Russia, where accurate information is unobtainable, we are the only European great power whose expenditure on armaments is larger than it was in 1913.

Every person in this country knows that Lord Cecil has resigned from the Government through the highest motives, and I hope his words on the necessity of limitation of armaments still further will be listened to all over the country as being necessary for obtaining an enduring peace throughout the whole world. The only thing I would wish him to do is to differentiate a little more clearly between total disarmament, which at the present time is impossible, and limitation of armaments, which is possible, as in going about the country I find many of his supporters who belong to the League of Nations Union do not understand the difference.

I feel confident that the taxpayers of the naval nations desire some measure of further limitation, and will not be prepared to authorize the expenditure of the many millions required to replace the ratio of battleships allowed under the Washington Agreement.

We are pledged to the nations of the world to reduce armaments all that is possible, and I am certain most people in this country will be against an armament race in battleships when the Washington Agreement expires in 1931.

Admiral Drury Lowe, a very well-known and able gunnery officer, writing to the Press recently, observes—

The conclusion, therefore, is that the size of capital ships, the covering force required for sea warfare, can be very greatly reduced without any loss of security to the nations provided it is general, and also, I believe, with an absolute gain as against attack from submarine and air, a maximum of 10,000 is ample and 5,000 to 6,000 tons for the cruisers on the trade routes.

This problem of how naval reductions can be made consistent with the security of the British Empire must be faced in the near future. Expert naval thought must concentrate upon how this can best be done. The whole idea underlying the pressure for a further reduction of armaments is to allow the heavy burden of taxation to be lifted from all the leading naval nations of the world, and allow Europe to recover some measure of economic stability. If we keep up great naval, military, and air armaments, it will be almost impossible to prevent more conflicts, and it may be truthfully said that the whole future civilization of the world as we now know it depends on peace. European nations should see that if they continue sapping their strength and treasure in more wars, Eastern nations, thinking in terms of loot, will cast longing eyes at some of the large western cities. This will certainly occur if they continue to waste their substance in strife, and it may become increasingly difficult to keep them out of Europe. America did not fail us in the Great War, and by her good help the Allies prevented a military domination of Europe. Surely, then, it

becomes unthinkable that she should not pull her weight in the boat in every way, by endeavouring to check a further race in naval armaments. This will happen unless she assists to settle the battleship and cruiser problem that confronts the chief maritime powers. It is to be sincerely hoped that a second Washington Conference will be convened in the near future and that the statesmen of the signatory powers of the Washington Conference will be determined to find a solution to limitation of armament problems. In the meantime it is to be hoped that the United States, France, Italy, Japan, and Great Britain will profit from the breakdown of the Geneva Conference by enabling each nation to study and better understand the difficulties and problems the other nations have to face and surmount. If wiser counsels do not prevail, and France, with Italy, prefers to remain outside a future Washington Conference, then the United States, Japan, and Great Britain had better bring into being a security pact, and arrange their naval armaments accordingly.

The United States Secretary of State, Mr. Kellogg, in January, 1928, proposed that the Powers should sign a treaty in which they declare that they condemn "recourse to war," and renounce it as their national policy towards each other. On reading this proposal, one wonders if it is national policy to defend ourselves against aggression.

I should imagine the foreign policy of this country is largely guided by the wise hand of Sir Austen Chamberlain, when surveying the work done at Geneva under the League of Nations Covenant and the Locarno Treaties.

Mr. Kellogg's proposals are excellent in principle, but would it be wise for all of the nations who signed the Covenant of the League to assist in creating a body that might develop into a possible rival? I feel certain they would not grudge the United States a diplomatic success on the eve of a Presidential Election, but I should imagine most of the Signatory Powers would consider further international agreements outside the League of Nations Covenant undesirable.

CHAPTER II

MILITARY AVIATION

Went the day well ?
We died and never knew,
But well or ill, -
England, we died for you.¹

"NEON" advocates abandoning all idea of air power from the military point of view. Whether the author of *The Great Delusion* has earned the right to give a considered opinion on air matters military is not within my knowledge.

But I should regard it as an impertinence on my part if I attempted to lay down the law on military aviation, and I feel confident no military man would attempt to teach me how to run a submarine or airship. The military expert must lay down what he wants in the way of aerial reconnaissance, both strategical and tactical, registration of artillery fire, photography, bombing of military objectives, etc., and get pilots and observers detailed for military air work trained in military requirements.

One thing I do know about military air matters is that, thanks to Mr. Winston Churchill's encouragement, when he was First Lord of the Admiralty, to expand the Naval Air Service as much as possible, I was able to supply, with Admiralty approval, dozens and dozens of machines and engines to the military wing when, through delays in delivery of their machines, they ran short.

Sir Hugh Trenchard will no doubt recollect that out of our first order of 150 "1½ Strutters"—the high-performance machine built by that enterprising and brilliant aircraft constructor, Mr. Thomas Sopwith, for the naval wing—we handed most of these to our military comrades to help them

¹ In memory of Jack MacVicker, Lieutenant, R.A.F., killed in an air fight in France, 22nd July, 1918.

combat the German Fokker machines that at that time had gained temporary ascendancy over our aircraft at the Front. We gave three of these Sopwith machines to the French airmen, and they successfully bombed Essen with them, which showed that Mr. Sopwith had produced a successful machine, as this was the objective type was specially designed for. (Plate 25.)

In dealing with the subject of the naval wing supplying the military wing with machines, I notice that Sir Walter Raleigh, in his book, *The War in the Air*, observes—

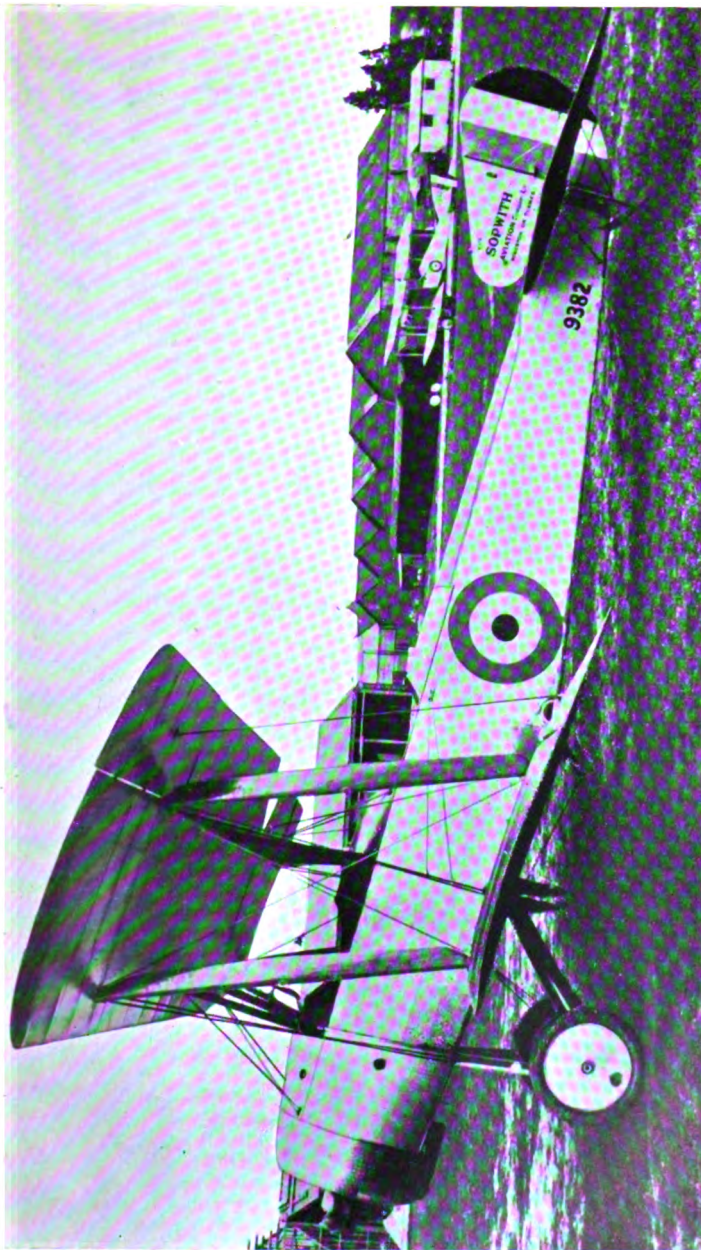
The Admiralty were many times asked by the military authorities to hand over to the Royal Flying Corps large numbers of machines and engines which were on order for the Royal Naval Air Service. To the best of their ability they fulfilled these requests, but the zealous members of a patriotic service would be more or less than human if they felt no regret on being deprived of their own material.

I do not agree with the late Sir Walter Raleigh's remarks in the last part of this extract, as there are Minutes in existence saying it was the great aim of the Naval Air Service to help all that was possible to maintain the mastery of the air on the Front and at Dunkirk.

The military wing had only to state clearly what their requirements in the way of machines and engines were, and my very able colleague, Admiral Vaughan-Lee, who took over the direction of the Naval Air Service from me, was just as keen as I ever was to meet the wishes of General Henderson or General Trenchard.

Our great difficulty was to find out a little in advance what these requirements would be.

In some cases the delivery of engines for the military wing were hung up by bad delivery on the part of the French firms, and as soon as Admiral Vaughan-Lee or myself were informed of the shortage, we at once placed our engines at the disposal of the military wing. In no case do I remember the R.N.A.S. demurring at giving the military all they required.



THE FIRST HIGH-PERFORMANCE MACHINE
Sopwith's famous 1½ Strutter

All the naval airmen were full out to help Sir David Henderson in every possible way, and because we were able to render him some considerable help when he was up against delivery difficulties we were all the more pleased to read Sir John French's very high appreciation of this very gallant officer's good pioneer work, for he wrote to Lord Kitchener as follows—

I wish to bring to your Lordship's notice the admirable work done by the Royal Flying Corps under Sir David Henderson. Their skill, energy and perseverance have been beyond all praise.

They have furnished me with the most complete and accurate information which has been of incalculable value in the conduct of operations.

Now, what does "Neon" say?¹—

Cool and dispassionate consideration of the facts will show, however, that air power is illusory and air supremacy a will-o'-the-wisp. The development of aircraft for war purposes is a sheer waste of men and money, and moreover constitutes a grave danger, since expenditure and dependence upon unreliable and futile weapons is a sure road to defeat.

The reader will have no difficulty in deciding which of the two views—the Commander-in-Chief of the British Armies in France, Sir John French, or "Neon's"—is likely to be the more accurate.

One of the most wonderful things of the War was the way the enterprising young men of this country, our Dominions, and Allies, learnt to fly and took up air work with so much enthusiasm.

What I always admired so much in our military airmen was the rapidity with which they developed with mighty little training and without any data handed down to them, as we have in the older Services, the strategy and tactics of air fighting.

In the last year of the War our military airmen were simply superb.

The systems these brave pilots developed in the various phases of scientific fighting were many.

¹ *The Great Delusion*, Preface.

Some people imagine that in air fighting it is merely a reckless and gallant dash, end on, for a hostile aeroplane. That is not so. There are recorded cases where our pilots have scientifically stalked a German machine for an hour or more, where airmen have concealed themselves in the clouds and dived through almost on top of an enemy's machine.

The reckless young airman is of little value to the Nation and soon comes to grief. The best air fighter is the man who uses his brain, nurses his machine, is not unmindful of his observer or crew, and who trains himself to be physically fit and master of the emergency.

Hundreds of different methods of attack were developed, singly and in company with other machines, and tried with much success by not only our airmen, but also those very fine pilots of our Allies in their great air battles.

Aerial duels are won by pilots in the pink of condition, with steady nerves, coolness, good machine performance, and very largely by surprise.

Every possible position for the best line of attack when flying a single- or two-seater has to be carefully studied beforehand, and be within the pilot's knowledge at the time the position for encounter is taken up. Also the best line when turning away must be as carefully studied, so as to avoid coming under the enemy's fire. Our military pilots became past masters in these different and difficult phases of air fighting, and won the admiration of all of us who had backed the air from the early days.

Would I be far wrong in saying these military pilots ascertained for Lord French and Lord Haig what all great commanders of the past have always desired to know, and that is— "What is on the other side of the hill?"

For the first time in history, this information became available, by the fine work of our airmen, to high military authority.

The work of our military wing was much appreciated by the chief French military command, for I find, after the Battle of the Aisne, in September, 1914, General Joffre, the

French Commander-in-Chief, paid this compliment to our military airmen—

Please express most particularly to Marshal French my thanks for the services rendered to us every day by the English Flying Corps. The precision, exactitude and regularity of the news brought by them are evidence of their perfect organization and also of the perfect training of pilots and observers.¹

Other great men hold different views to the nebulous "Neon," who is intrigued to see nothing good in aircraft. May I be permitted to quote three?

Marshal Foch is one of the greatest commanders that the world has been privileged to possess. He has said²—

The military mind always imagines that the next war will be upon the same lines as the last. That has never been the case and never will be. One of the great factors in the next war will obviously be aircraft.

The potentialities of aircraft attack upon a large scale are almost incalculable. But it is clear that such attack, owing to its crushing moral effect upon a nation, may impress public opinion to the point of disarming the Government and thus become decisive.

Another authority is Monsieur Laurent Eynac, who, until the middle of July, 1926, was the much esteemed French Under-Secretary of State for Aeronautics. In a paper on "The Policy of Bombardment," written early in 1918, Monsieur Laurent Eynac, after reviewing the various methods of protecting a city from air raids, such as barrage fire from anti-aircraft guns, guided by sufficient searchlights, captive balloons supporting cables, and night-flying chassé machines, comes to the following conclusion—

The best defence remains the attack, and there is no surer protection than to have at your call, to reply to the enemy's blows, a solidly organized air force for fighting and bombing work by day and by night, to give that force good and numerous machines, to provide it with quality as well as quantity, to make its personnel a service

¹ *The War in the Air*, by Sir Walter Raleigh, page 335.

² Marshal Foch said this to Brigadier-General P. R. C. Groves, the capable General Secretary of the Air League.

d'élite. It is the aerial offensive which will be our safeguard. Neither the space of the ocean nor the space of heaven can be closed.

A third authority whom I should like to quote is Sir W. Robertson, who, on page 351 of his *From Private to Field-Marshal*, 1921, states that

In the air, as on land and sea, our best form of defence will lie in the ability to attack.

In times of disaster, our aircraft were distinctly helpful, for such a high air authority as my esteemed colleague, Sir Frederick Sykes,¹ states that—

Even in 1914 Sir John French was able to write that it was the timely warning given by aircraft which chiefly enabled him to make speedy dispositions to avert disaster on the retreat from Mons.

A special dispatch to *The Times*, dated 2nd August, 1917, gave an excellent account of the work of some of our military pilots. In a paragraph headed "Our Swallow Airmen," the correspondent wrote—

In my dispatch yesterday I told how the bad weather and the thickness of the air had robbed us on the day of battle of the advantages of aeroplane observation, though in spite of everything our men had flown out and, descending below the clouds, fired on the enemy infantry in the trenches. Later information shows that, notwithstanding the bad conditions, they did splendid work. The lowness of the clouds compelled most of the flying to be done at heights below 500 ft. Much of it was below 200 ft., and in many cases individual machines went much lower. By thus working close to the ground, almost like swallows on a wet day, they were able to keep contact with our advancing infantry and did an immense amount of valuable work, though constantly under machine-gun and rifle fire. In all their fighting against hostile machines and men and guns on the ground our flying men used on the one day over 11,000 rounds of machine-gun ammunition besides some revolver ammunition.

The German prisoners captured in the Allied offensives of 1917 were especially bitter about the work of their artillery and airmen. A letter to his parents, taken from a prisoner

¹ M.P. for the Hallam Division.

captured in the Arras battle, is particularly illuminating. He had written—

These British airmen are the very devil, for they come down to our trenches and almost enter our dug-outs, bombing and machine-gunning and seeming to take the greatest pleasure in doing so, and quite regardless of our rifle fire. We should not be at all surprised at any time to know that they had found a way of flying right through our dug-outs, and we have no peace from them night or day. Very different from our German airmen, who spend their time pinning Iron Crosses to their tunics and sitting in *cafés* smoking and telling stories of their own bravery. We would much rather see examples of their bravery than listen to their stories of it.

This letter shows clearly the value of our military airmen's great effort. But we must always remember that the large-scale offensive employment of the air arm had barely commenced in the final stages of the Great War, the independent force under Sir Hugh Trenchard being still relatively in its infancy. Even then, small-scale operations that were carried out proved conclusively the enormous potential value of the independent air offensive—how far-reaching may its results be in any future war!

In support of this opinion, may I quote one of our soundest airmen of the present day, Air Vice-Marshal Sir Philip Game. When he lectured at the University College in May¹ last, he said that—

Aviation was going to be more revolutionary than any of the inventions that had affected strategy throughout history. We had not at present had much experience of air strategy, because during the War 1914-18 the Air Forces had been engaged in assisting the Army and Navy and the strategy governing the tactical movements of our squadrons had not been air strategy but land and sea strategy.

Now, I want to refer to a quotation in "Neon's" book that in my judgment is most grossly unfair to our military airmen. It is this²—

Perhaps the most remarkable and significant allusion to aircraft refers to the time of the great German advance in March, 1918

¹ 1927.

² *The Great Delusion*, Preface.

—when the result of the War and the fate of Europe hung in the balance—when the British alone lost 70,000 prisoners and 1,000 guns, and suffered 300,000 casualties. Major-General S. F. Maurice states : “ Our airmen, who *watched* the long drawn-out struggle from above, have described how, in its last stages, the infantry upon both sides were too exhausted to move, save at a slow walk and would lie for hours opposite to each other without firing, having lost the energy to load and fire *save* in a real emergency.

By placing the word “ watched ” in italics, and reading previous pages, “ Neon ” desires to convey the impression that when this great German push was made our military airmen merely watched. This view is borne out by Mr. Pollen, when he says (I quote his words)—

The airmen neither warned us of the great attack of March, 1918, nor could help the Army when the attack began. They could only “ watch ” it dazed by their own impotence.¹

What does Sir Douglas Haig say in his dispatches of the 20th July, 1918, page 8, under the heading “ Indication of the Coming Attack ”? “ I concluded,” he writes, “ that the enemy intended to attack at an early date.

“ *Constant air reconnaissance* over the enemy’s lines showed that rough and ready communications were being improved, and ammunition and supply dumps increased along the whole front.”

Later, in the same dispatch, when dealing with the German push in March, he writes¹—

The work of the Royal Air Force, under command of Major-General J. M. Salmond, C.M.G., D.S.O., in co-operation with the other arms, has been brilliant. Throughout the period of active operations our airmen have established and maintained a superiority over the enemy’s air forces without parallel since the days of the first Somme battle. Not content with destroying the enemy in the air, they have vigorously attacked his infantry, guns and transport with bombs and machine-gun fire, and in the fighting south of the Somme in particular gave invaluable assistance to the infantry by these

¹ *The Great Delusion*, Preface.

² *Naval and Military Dispatches*. Vol. IX, page 54.

means on numerous occasions. In addition, the usual work of reconnaissance, photography, artillery co-operation, and bombing has been carried out vigorously and with remarkable results.

May I ask "Neon" and Pollen if Sir Douglas Haig's dispatch conveys the impression that our military airmen merely "watched"? In common fairness to brave men, I most emphatically say it does not, and we may presume the Commander-in-Chief of the British Armies in France knew what he was writing about.

Take, again, Allenby's dispatch of the 31st October, 1918, where he is continually referring to the Air Force in terms such as the following—

Besides taking an active part in the fighting, the Air Force provided me with *full and accurate* information as to the enemy's movements.

Again, on page 91 of this dispatch, in dealing with the havoc wrought by the Air Force on the Turkish columns in retreat, Allenby writes—

The disorganization which already existed was increased by the repeated attacks of the Royal Air Force . . . The head of the column was heavily bombed . . . the drivers left their vehicles in panic, wagons were overturned, and in a short time the road was completely blocked . . . great quantities of transport and enemy's guns were found abandoned by the roadside. On one stretch of road, under five miles in length, 87 guns, 55 motor lorries and 842 vehicles were found . . .

The dispatches of Haig, Allenby and other great Generals bristle with such passages, which are in flagrant contradiction of the deprecatory statements of "Neon" and Pollen.

May I give a short extract from Colonel Lawrence's fine book, *The Revolt in the Desert*, in which he says—

It was the R.A.F. which had converted the Turkish retreat into rout, which had abolished their telephone and telegraph connections, had blocked their lorry-columns, scattered their infantry units. Salmond and Borton shared, so to speak, not merely in Allenby's tactical work, but in his very strategy. Tul Keram, Messudieh, Jenin, and Afuleh in turn were air-contained so drastically that their

use was denied the enemy for hours before any of our ground troops drew near.

But the climax of air attack and the holocaust of the miserable Turks fell in the valley by which Esdraelon drained to the Jordan by Beisan. The modern motor road, the only way of escape for the Turkish divisions, was scalloped between cliff and precipice in a murderous defile. For four hours our aeroplanes replaced one another in series above the doomed columns: nine tons of small bombs or grenades and fifty thousand rounds of S.A.A. were rained upon them. *When the smoke had cleared it was seen that the organization of the enemy had melted away. They were a dispersed horde of trembling individuals, hiding for their lives in every fold of the vast hills. Nor did their commanders ever rally them again. When our cavalry entered the silent valley next day they could count ninety guns, fifty lorries, nearly a thousand carts abandoned with all their belongings. The R.A.F. lost four killed. The Turks lost a corps.*¹

After perusing the opinions of the very high military authorities I have quoted in this chapter, it will be difficult for Pollen and "Neon" to refuse to admit that our very gallant military airmen made a direct and valuable contribution to "Victory" in the Great War, and that aircraft, whatever their defects may be, will be of some considerable value in future operations, should we ever have the misfortune to be forced into another war.

¹ *The Revolt in the Desert*, pages 392 and 393.

CHAPTER III

NAVAL AND MILITARY SPOTTING BY AIRCRAFT

"SIGHT IS MIGHT"

IN the course of my duty on the Torpedo Staff of H.M.S. *Vernon* and later in the Director of Naval Ordnance Department at the Admiralty, I came into very intimate contact with many gunnery officers, particularly when working out the first fire control electrical circuits for the *Dreadnought* and many battleships that came after her. There are no more efficient Officers in the Navy than our gunnery experts. They were most keen on taking the fire control position from the conning tower and placing it in the fighting tops, developing fire control, instruments, etc., to make their gunfire more accurate. These efforts were most successful, and the percentage of hits on prize-firing targets increased enormously, as I knew from being a marking officer in three battleships. But what I can never understand is why the gunnery experts in the *Excellent* and the D.N.O.'s Department at the Admiralty did not clamour for aerial reconnaissance and spotting from the moment an aeroplane or seaplane could fly at an altitude of a few thousand feet and remain in the air for an hour or two. This has puzzled me for years. Up to August, 1914, we had no request from the gunnery experts of the Navy for aerial spotting. If we had received a little support from the *Excellent*, more money would have been available to develop wireless for aeroplanes and seaplanes, and generally air effort would have advanced quicker than it did. Previous to aerial spotting, the gunnery efforts of both services were often not so effective as they were thought to be. What looked like hits were sometimes misses. There is the historic case of the seaplane pilot spotting for the *Queen Elizabeth* in the Dardanelles operations, imploring that the "Lizzie" should be asked to alter her sights as all her shots were short.

Mr. Joynson-Hicks, speaking in the House of Commons¹ on 20th July, 1915, said—

There was also the naval episode, well known to everybody, namely, the destruction of a transport in Turkish waters by the guns of the *Queen Elizabeth*. The right hon. gentleman knows that there is no harm whatever in our knowing that the *Queen Elizabeth* destroyed a Turkish transport at a range of 18,000 yd. That was done by our wonderful modern gunnery without the *Queen Elizabeth* seeing the ship she was aiming at, or the sea upon which that ship rode, and it was due entirely to our naval Air Service being able to communicate with the *Queen Elizabeth*, and show exactly where it was she was to direct her fire.

A military officer thought his fire was most effective, whilst the Army aeroplane pilot reported: "I saw guns dropping shell after shell into a certain area, and there was not a man within miles of it." "Neon" and such kindred souls would have us continue this waste of ammunition, whereas the airmen would sooner, if guns have to be discharged at all, that they should contribute to the victory that we all would desire. Aerial spotting from aeroplanes and seaplanes has come to stay, and by a very close co-operation between the airman and the naval and military artilleryman much may be effected.

When we put some twenty machines over the ships that were assembled at the Spithead Naval Review just before the War, they were looked upon as Winston's² "toys," and one Flag Officer kindly told me it made him sick to see Winston go round the seaplane sheds at Calshot, as it was like an owner going round his damned stables with all the stable boys in attendance. It is no use anyone arguing that some Admirals did take interest in air development during the War. They were always too late, because they would not take the advice of their airmen when the machines could have been most effective. Airmen cannot do impossibilities. A little encouragement to the air people before the War would have made a

¹ *Hansard*, Debate on Vote of Credit, 20th July, 1915, column 1354.

² Winston Churchill, then First Lord of the Admiralty.

tremendous difference. We left it until after the War started to think about developing wireless for spotting by aircraft for battleships when bombarding. This was unfortunate, as our spotting machines were not always available when most required. Good weather is required for good spotting, and the spotting machines must be protected from hostile aircraft by their own fighting machines. High winds are not always a deterrent to spotting, but a heavy mist over the ground makes spotting almost impossible.

Anti-aircraft guns make the machines fly high and keep them changing their direction. They do not prevent spotting, but hinder the machines in carrying out their work.

It can safely be said that during the period that preparations were being made for the Battle of the Somme every unit in the British Forces was engaged in tuning-up to the highest pitch of efficiency.

The Royal Flying Corps was not behind in this respect. General Trenchard saw to this, and with his accustomed thoroughness he set about in energetic fashion to make the military air branch a force to be reckoned with by the enemy, and highly respected throughout the other British units.

One of the first tasks that received the attention of our airmen was that of effective artillery registration.

This work required an enormous amount of initiative, skill, and courage.

Another difficult task was the development of wireless telegraphy for artillery co-operation. At that time our wireless apparatus was extremely primitive and amateurish. But the progress in wireless improvements, from all points of view, was soon rapid and extensive. Fine results were achieved, thanks to the initiative, skill, and courage displayed by such pioneers as Colonel Lewis and Captain James, who both gave up their lives to wireless development.

During the period under review pilots and observers were attached to the various artillery units, so that they might realize for themselves how battery commanders carried out

their various tasks. This enabled the airmen to appreciate various difficulties, delays, etc., that always arise when on active service.

Pilots and observers were also given ample training in their own squadrons by means of ingenious ground maps. These maps showed in replica a correct representation of the enemy lines, gun emplacements, etc. Exceedingly clever devices were evolved to represent our own guns and those of the enemy. A code of signals was skilfully prepared, and, with the aid of wireless, pilots and observers were enabled to conduct their "shoots" efficiently prior to undertaking the real task over the enemy lines.

A great deal of the success of this special training was due to Group-Captain A. B. Burdett, D.S.O., then in command of No. 9 Squadron, who devoted a considerable amount of time in perfecting this system of training.

It was during the Somme Battle that co-operation between the Royal Flying Corps and infantry was carried out for the first time on really effective lines. For months prior to the battle special machines, styled "Contact Patrols," were detailed to work with various units. Pilots and observers were allotted to brigades and battalions and intensive training was practised behind the lines. Extraordinary efficiency was thus established long before the actual battle commenced. Here, again, great credit was due to Group-Captain A. B. Burdett, who was instrumental in perfecting a system of codes, signals, etc., which enabled successful co-operation between the infantry and the airmen.

It must have been a proud day for General Trenchard when he received the thanks and testimony of all ranks on the complete success and inestimable value of this "Contact Patrol" system. A striking feature of these "Contact Patrols" was the extraordinary accuracy, reliability, and rapidity of all reports forwarded to the various headquarters and infantry units. Corps, division, and brigade commanders received an unprecedented amount of information as to the position of

our own and the enemy troops. This was a tremendous help, as it enabled the various commanders to issue their orders expeditiously.

Shortly after the Somme Battle had been in progress, special branch intelligence sections were inaugurated, these units being formed for the purpose of supplying every possible piece of information to army corps, headquarters, and other units.

General Trenchard was always of opinion that the Royal Flying Corps should be the first unit to supply correct and up-to-date information whenever called upon, and he worked unceasingly to attain this end.

The first two "Intelligence" sections to be formed were those of No. 9 Squadron and No. 3 Squadron respectively, the former being assigned to work with the 13th Army Corps and the latter with the 1st Anzac Army Corps.

The chief functions of these branch intelligence sections were to supply the respective army corps and other units in the corps with up-to-date information at frequent intervals. Some of the duties carried out were as follows—

1. Compilation of reports received from pilots and observers, various reports being collated and simplified.

2. Interpretation of aerial photographs of enemy positions.

3. Compilation of special maps, etc.—

- (a) "Situation Maps," showing the exact position of enemy troops.

- (b) "Contact Patrol Maps," showing in detail the position of our own troops as well as those of the enemy, the state of enemy defences, strong points, gun emplacements, etc., and much other useful information.

- (c) "Bombardment Effect Maps," showing in detail the exact degree of destruction carried out on the enemy position of the various sectors of the line. These maps were drawn to a large scale, usually 1/2,000, and were distributed each evening to the various battery commanders throughout the corps. These maps were of great assistance to the battery commanders, as they enabled them to see at a glance the extent of destructive

work carried out by their batteries. They were thus enabled to plot out their next day's task with appreciable ease.

Careful training and close co-operation between the Navy and Army with the airmen is necessary to get the best results. The younger naval officers afloat are beginning to recognize the value of aircraft for reconnaissance, spotting, torpedo dropping, etc.

Distances are gradually increasing year by year, and as aircraft develop they will become of greater value for fleet operations.

Even Admirals afloat are now taking more interest in air effort.

No longer will airmen be entertained by a senior officer making peculiar signals, as is shown by the following "intercepted by wireless" in the North Sea—

Cruiser : " Report if weather is still unfavourable for flying."

Engadine (aircraft carrier) : " Submitted. Swell is too heavy for using seaplanes without considerable risk of damage to their chassis."

Cruiser : " Why cannot seaplanes fly without their chassis ? "

This is about as good as a senior officer, almost overburdened with gold stripes, at the Admiralty, questioning the Director of the Air Department in the early days of the War, said—

" How did the aeroplanes get to Ostend ? Did they go in packing cases ? "

" No, oh, no, sir. They flew ! "

Fortunately, we have now in charge of the Air Section at the Admiralty an Officer who has been connected with naval air work from its infancy, Captain Cecil Talbot, D.S.O. He assisted Lieutenant-Commander Neville Osborne and myself at Barrow during the *Mayfly*¹ trials, more particularly in connection with mooring the *Mayfly* successfully to the mooring mast when she stood half a gale of wind in 1911. I feel certain he will do his very utmost for air development, and turn the cold shoulder on the Whitehall intriguers, who desire to break up our most efficient Air Force.

¹ No. 1 Rigid Naval Airship.

CHAPTER IV

AIRSHIPS

After me cometh a builder—
Tell him I, too, have known.

KIPLING.

IN the greater portion of "Neon's" book a slashing onslaught is made on airships. These criticisms are all stale. We have heard similar attacks in Whitehall so often. They are all from the same source, never vary, and are so wearisome. Many Governments have come and gone since our first airship was constructed. Airship policy has, in consequence, wobbled. But it is no fault of the airship.

Generally speaking, airships in this country have suffered because high authority has not taken the trouble to master the elementary technique of the subject. Until lately no real official encouragement has been given to the development of this branch of aeronautics and the study of the problem scientifically.

The critics say airships are expensive and cost more than aeroplanes. They require costly sheds.¹ To inflate them they require expensive hydrogen or more expensive helium² gas. They are vulnerable, not only to hostile aircraft, but, being large targets, offer great opportunities to artillery. Hydrogen gas in contact with air is highly inflammable.

All this is quite true, and is not denied by those who have advocated airships. Many held the view that the development of seaplanes and aeroplanes would leave no room for airships being a practical proposition in warfare or for transport

¹ Millions and millions have been expended in building railway stations, railway lines, sidings, depots, etc., for land transport and in developing docks and harbours for surface ships, see page 278.

² Helium is very difficult to obtain. We have a little in Canada. The Dexter mines in Kansas, U.S.A., yield 1.84 per cent of helium and will give 100,000 cub. ft. per day. Air contains .0004 per cent by volume of helium.

purposes. They thought that the aeroplane could do anything the airship could accomplish and do it better, and if it came to a fight in the air the more vulnerable and valuable airship would be destroyed.

This is partly true. But it also shows that the airship problem has been imperfectly studied.

Airships being costly, they have suffered, as only Governments can afford to experiment with them, whereas the aeroplane has gained much by private firms being in competition in carrying out orders, not only for Governments but for private enterprise.

In dealing with this subject, it may be as well, first of all, to make it clear that airship construction is divided into three distinct systems, viz.—

1. Rigid.
2. Semi-rigid.
3. Non-rigid or flexible.

1. Briefly, the rigid type is the Zeppelin that we all are more or less familiar with.

In this type, the first essential is a strong framework of girders constructed with a light alloy of aluminium or duralumin, or a rustless steel used with duralumin for the construction of the girders. These are built up of channel bars of duralumin or rustless steel tubing, with the necessary light struts of duralumin.

Duralumin has, roughly, the same tensile strength as mild steel, with one-third of its weight and its specific gravity is 2.85.

The framework of a rigid airship contains many separate gas bags housed within it, and these are protected from the actinic rays of the sun by an external envelope.

The gondolas, or power-unit eggs, are usually slung just below the rigid keel framework, and contain the navigating instruments, rudder steering wheels for controlling the motion of the airship in the horizontal and vertical planes, engines, crew, etc., as shown in Plate 34. Some designers favour placing

the navigating and control position or cabin within the hull structure, instead of being in a separate gondola, as in the German Zeppelin.

A rigid airship is built up of a metal framework, gas bags, outer cover, gondolas, or power-unit eggs. It shows ignorance of elementary airship technique to say, as "Neon"¹ does, that the *Mayfly* was constructed of duralumin.

2. The semi-rigid consists of a stiffened girder of an alloy of aluminium, duralumin, or steel, running fore and aft along the bottom of the envelope, and to this are secured the cars, nose cap, tail cap, and fins.

3. The non-rigid has no stiffening girder, and consists of a fabric envelope to which the car is attached by wire suspension. The shape is maintained by constant internal gas pressure.

I will not weary the reader with the techniques of airships, which can be obtained out of the numerous textbooks on the subject, but merely give a brief outline of the policy that was followed when the question of airships came to be considered by the Committee of Imperial Defence in February, 1909. It was decided by that body that the Admiralty should develop rigid airships and the Army "heavier than air" machines with a few small non-rigid airships.

The first naval airship built to Admiralty order by Messrs. Vickers was the *Mayfly*. Her dimensions were—

Length	512 ft.
Diameter from top of airship to bottom of gondolas	61 ft. 10 in.
Capacity of hydrogen gas bags	663,518 cub. ft. with gas bags 100% full.

When I took up my first airship appointment as Inspecting Captain of Airships in the autumn of 1909, I found this airship had been designed to float on water, and the airship shed at Barrow was exceedingly narrow. Consequently, in getting the airship out of the shed it was like drawing a cork out of a bottle.

¹ *The Great Delusion*, page 62, footnote.

Both Mr. Reginald McKenna (then First Lord) and Mrs. McKenna took great interest in the *Mayfly* whilst she was under construction. In the course of my duty I had to see Mr. McKenna with regard to trying to get a proper programme for airship development. Messrs. Vickers were pressing that other airship designs should be considered and approved, so as to get a continuation of airship work to keep their experts employed, but Mr. McKenna could not persuade the Sea Lords to lay down a proper airship programme. He informed me that the First Sea Lord was very much against airships, and certainly, at a later date, this Admiral did his utmost when serving on the Committee of Imperial Defence to block airship development, as official papers can disclose.

When more experience is gained with large airships, I have no doubt they will ultimately be developed to land on water, but this was too ambitious an effort for our first rigid. In getting the *Mayfly* out of the shed the second time, she collapsed through structural weakness. From a purely experimental point of view she was a success, as the lessons we learnt were simply invaluable in the War.

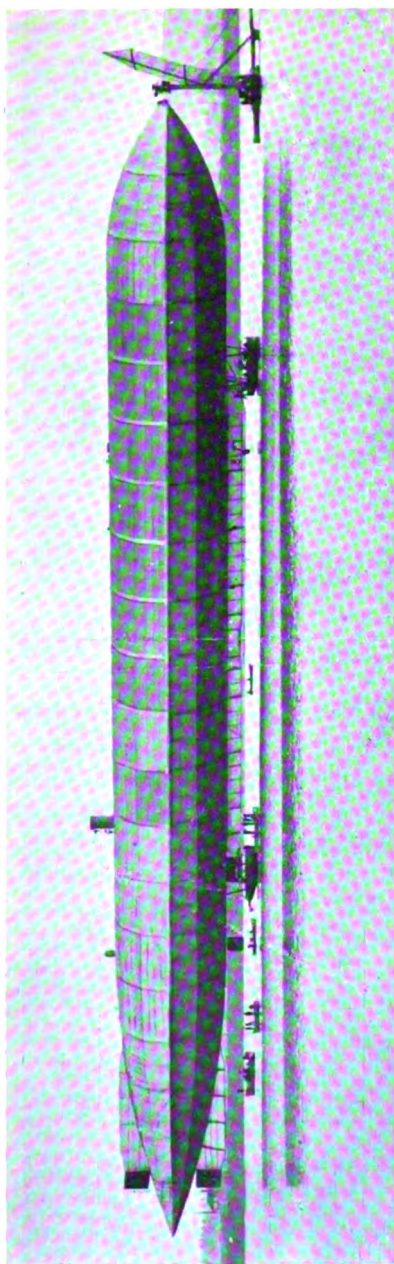
I floated this airship in the air for many hours with full load. She weathered half a gale of wind at a mooring mast for four days (Plate 26). On Tuesday and Wednesday morning of the 23rd and 24th May, 1911, the Maxim pressure plate (Negretti and Zambra) showed the velocity of the squalls to be 42 to 45 miles per hour. This was the first time in history that a large rigid airship was moored to a mast, and I think Messrs. Vickers' letter to me is not without interest in dealing with this novel experiment. (Plate 26.)

NAVAL CONSTRUCTION WORKS,
BARROW-IN-FURNESS.

24th May, 1911.

DEAR CAPTAIN SUETER,

I am exceedingly pleased to receive your letter of this date, stating that we have established a world's record in building an airship which has successfully withstood the heavy gale of last night while moored in the open.



RIGID NAVAL AIRSHIP NO. 1 AT MOORING MAST, BARROW-IN-FURNESS, MAY, 1911

The Chairman and Directors take this opportunity to heartily congratulate you on the successful launch of the ship, and likewise on the splendid well-thought-out arrangements made by yourself, resulting in her being so safely and satisfactorily moored. At the same time, it was felt that the heavy breeze during the first night after the launch must have given you a somewhat anxious time.

I thank you on behalf of myself and our experts for your very kind observations which are, you can rest assured, greatly appreciated. Will you kindly permit me to place on record how very much we esteem the hearty collaboration of your good self and your staff in the building of the first airship for the British Navy, and to state how confident we are that a considerable amount of the success which has been achieved is due to the invaluable assistance so readily rendered at all times by yourself, your officers and your men.

Yours sincerely,

J. McKECHNIE.¹

I used spring balances to ascertain the pull on the bow wire of this airship after the half gale of wind experienced on Wednesday, 24th May, had abated.

Sixteen readings were taken with a wind velocity of 17 miles per hour. The mean of these readings was 420 lb.

This was an interesting experiment. The bow of the *Mayfly* was struck to a two diameter radius, and the stern to a nine diameter radius, following the usual Zahm figures, and her volume was increased by placing a parallel portion between forward and after end, at a point where the tangent to the meridian is parallel to the horizontal. With this airship we learnt to handle large volumes of hydrogen gas, specialized in outer cover and gas bag fabric work, in carrying out at Barrow, and with the help of the National Physical Laboratory, a long series of tensile tests in warp and woof of a large variety of fabrics. Also a large number of osmosis experiments were carried out, to determine the rate of leakage of hydrogen through various gas bag materials, and entry of air. We found slightly more nitrogen leaked in than oxygen. These seam tests and permeability tests were all most instructive. We

¹ Now Sir James McKechnie, K.B.E., the eminent engineer.

studied the loss of lift through large variations of temperature. Also, with the good and always ready help of the National Physical Laboratory, when Dr. Glazebrook¹ was the able Director, the stability of various aluminium alloys, such as duralumin, vibration tests with this metal, etc., were investigated.

The late Commander Neville Usborne also schemed out a very efficient water-recovering apparatus by cooling the exhaust gases of a petrol engine. I believe he was the first in this country to experiment in a practical manner in this direction. The National Physical Laboratory should have a report on these experiments. In this way we regained in water a very high percentage of the petrol consumed by cooling over a large surface the high-temperature exhaust gases from the petrol motor. Nearly all the work with the *Mayfly* we found of the greatest value in building up the small airship fleet that Admiral Lord Fisher required in the War to assist in countering the German submarine menace.

After the wreck of the *Mayfly*, I begged every Sea Lord to continue airship development, but without success. All airship work was closed down.

To wait and profit by the experience gained in developing a new weapon by another Nation is always a tempting policy to those in authority. Some said, why not wait, like we did with the submarine? France developed this under-water weapon of warfare—we stayed our hand until we were forced to come in. Then we soon caught the French up. Let Germany waste money in this costly airship business. We could soon catch her!

Fortunately, we did not go to war with France whilst we were playing the waiting game with submarines. But with airships, the Sea Lords of the Admiralty permitted a potential enemy country to develop a weapon that we did not possess ourselves.

Surely this was an unwise policy, and when war did break

¹ Now Sir Richard Glazebrook, F.R.S.

out with Germany in 1914, we had no rigid airships for working with the Fleet and keeping the North Sea under aerial reconnaissance.

There are plenty of minutes from the airmen at the Admiralty that were got out for authority and with the Committee of Imperial Defence to show that the Air Department always pressed for rigid airship development as likely to be of value to the Fleet.

Commander Masterman¹ held the same opinion, as I did, that we should not stay our hand and allow Germany to develop these valuable naval air scouts. This able airman's minutes on this subject were even more forceful than mine.

But the Sea Lords, in their great wisdom, would not be guided by their airmen, but preferred to take the views of an elderly ex-First Sea Lord on the Committee of Imperial Defence, who could see no value in airships. When this Admiral was opposing airships and crabbing their development for the Navy I am perfectly certain he had never seen one.

The airmen kept on pegging away for airships, and never took "No" for an answer, and in 1913 I obtained Admiralty approval to place an order through the Director of Contracts with Mr. Holt Thomas, the well-known and most capable aircraft constructor, for an Astra Torres airship of 350,000 cubic feet hydrogen gas capacity, with the French Astra Co. The Astra Torres airship was designed to be tri-lobe in form, and allowed an internal system of rigging to be used that distributed the load fore and aft the ship. This reduced the wind resistance considerably, as most of the rigging was inside.

Looking at the Astra Torres end on, she had the appearance of an ace of clubs. If rigged properly, to get an even distribution of the load, this type of airship for moderate-sized airships is most successful, as the envelope does not stretch unduly. Also I obtained approval to place an order with the Parseval Co., at Bitterfeldt, outside Berlin, for one of their new airships

¹ Now Air-Commodore Masterman.

of 300,000 cubic feet hydrogen gas capacity, length 279 ft., diameter 47 ft. 8 in. (Plate 27.)

This design allowed for two ballonets; one is placed as far forward as possible, and the other, slightly the larger of the two, is situated about two-thirds of the ship's length from the bow. It is on the transference of air from one ballonet to the other that this type of ship partly depends for its control in the vertical plane.

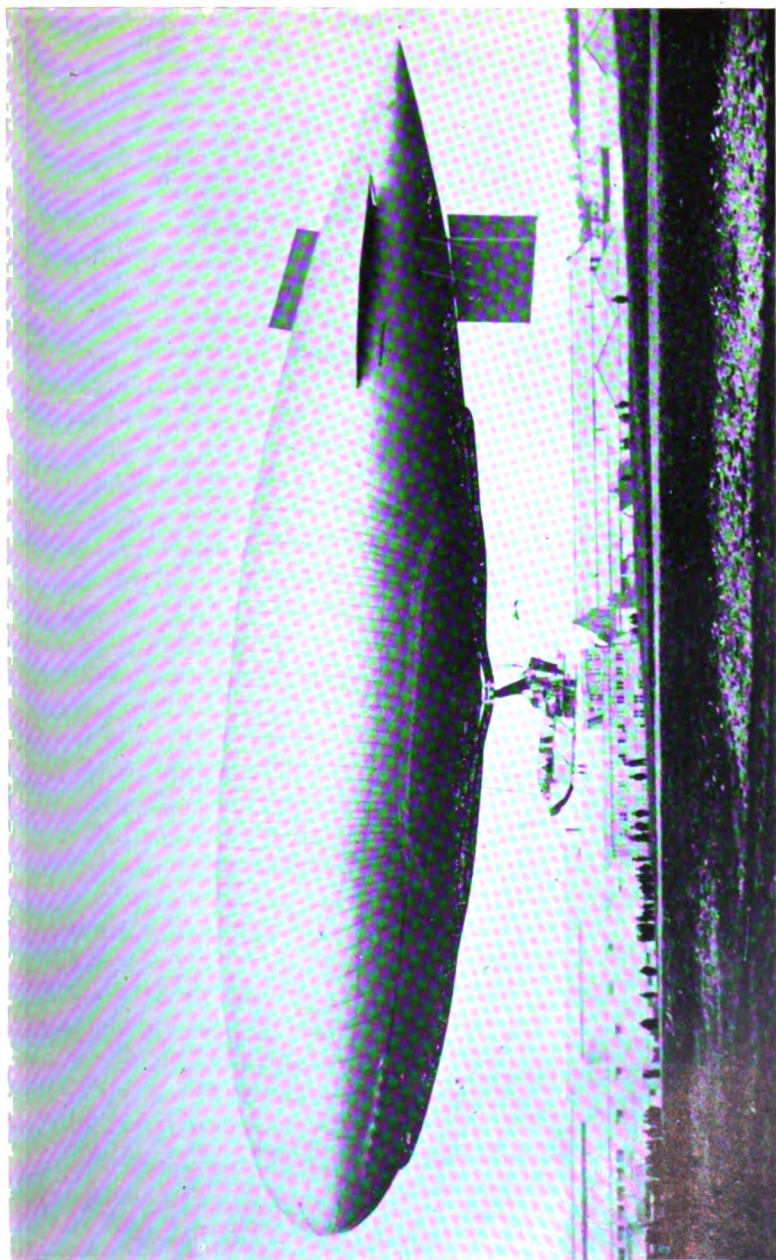
This method is very powerful when there is a considerable quantity of air in the ballonets, but, by itself, is not quick enough, and elevating planes have to be fitted. Air is supplied to, and exhausted from, the ballonets through hand-worked valves. The exhaust valves are also opened automatically when the gas pressure in the ship rises to 25 millimetres of water pressure.

The air is supplied by a large blower, worked by either or both of the main engines.

The suspension was novel and consisted of 32 webbing bands passing over the envelope. The three foremost and three after bands completely encircled the ship, while the remaining 26 were brought to a stout canvas band from which the car is suspended. The webbing bands were simply laid loosely over the ship and were covered by a light fabric which is stuck to the envelope. At the fore end of the envelope a special mooring band was fitted and this was joined to the main suspension band by stout canvas straps, so as to distribute the anchoring stresses. An aluminium framework, like the frame of an umbrella, was placed over the bow, to prevent it being blown in at high speeds. No signs of this occurring were noticed on any of the trials, but in the previous ship, built for Russia, it occurred at high speeds.

The car was slung from two parallel wire ropes, along which it is free to travel on pulleys for a distance of about 18 in.

The engines were two 170 h.p. Maybach six-cylinder engines, and arranged so that either or both would drive the propellers and auxiliary machine. Her speed was 46 miles per hour.



PARSEVAL AIRSHIP DURING TRIALS AT FARNBOROUGH, 1914

Whilst new, the envelope of this airship kept its shape well, but on service we found it soon stretched and lost its good streamline form. When this airship was completed, I went to Bitterfeldt with Commander Boothby and put her through her trials. The Parseval crew were well-trained airmen, and handled this airship well. Captain von Stelling, their experimental pilot, was a most skilful airship navigator. All the time I was in Germany I was treated with the utmost courtesy; even the officer told off to accompany me everywhere apologized for his beastly job of being a spy. He said he hoped I wouldn't mind very much, as his orders were not to let me out of his sight!

We took this airship to Farnborough, and one day¹ I brought her to London and looked into my office window at the Admiralty. Commander Boothby was in command of her. But little interest was shown in Whitehall, and few could spare the time from their desk labours to even look out of the window to see the first successful naval airship on her maiden visit to London. We put the Astra Torres through her trials at Farnborough, and in one of the flights I instructed the late Commander Neville Osborne, who was in command of this airship at that time, to bring up three dozen eggs, as I was not satisfied that we had enough rudder surface on this airship, so I thought we would turn a few circles and measure the diameter on the ground by means of the eggs dropped at regular intervals. We dropped the eggs from 800 ft. on a perfectly still day, and not a single one of the three dozen eggs smashed on the surface. They penetrated the earth like bullets! Whilst we were putting the Parseval and Astra Torres through their trials, the Secretary of State for War, General Seely, handed over to the Royal Naval Air Service all the small military airships, named *Beta*, *Gamma*, *Delta*, and *Epsilon*. Orders were given to the military pilots to train their naval colleagues in handling these small airships at Farnborough. It was a great blow to some of the military airship men to lose their commands. But they were all fine sportsmen. Most of them joined up with the Royal

¹ In 1914.

Naval Air Service, and, without exception, performed good and valuable air work in the War. The naval airmen were most grateful to General Seely and to their military colleagues for the very great trouble they took in training them in handling these small airships. Shortly before the outbreak of the Great War, the Admiralty sent me to Italy to inspect a new type of semi-rigid airship that had been brought to their notice by Messrs. Armstrong as having many new features that had been worked into her by an exceptionally skilled Italian engineer, Signor Forlanini. We tested this airship from her shed just outside Milan, and in one flight she broke down to windward of the Cathedral, and I had visions of the *Citta di Milano* impinging on that sacred edifice and wondering how many of the statues and pinnacles we would knock off. (Plate 28.)

But by many appeals to St. Anthony, and much hard work by Signor Forlanini's skilled engineers, the defects to the petrol motor were repaired in the air, before we got too close to the Cathedral. This airship was difficult to control in the air, as she had an inner envelope and a complete outer envelope.

Between the two envelopes was an insulation of some 2 ft. of air, the envelopes being kept apart by distance pieces not unlike the naval circular lifebuoy.

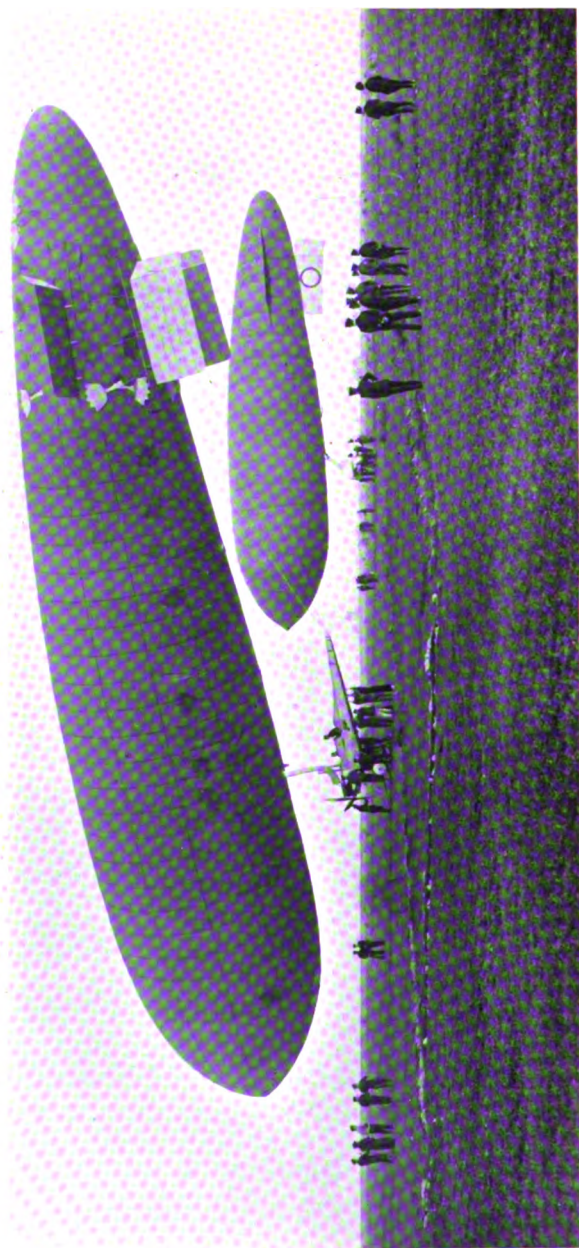
We had some difficulty in landing, as her control in the vertical plane was distinctly erratic. On one occasion we smashed up the wooden buffers badly, and everybody jumped out, and through inattention on my part I found myself alone in the airship and ascending rapidly, but fortunately the Italian military handling party had the airship well in hand, and seeing my predicament, soon hauled her down to allow me to leave the control cabin.

War broke out and prevented the Admiralty, as they had intended, from purchasing an airship from Signor Forlanini for experimental purposes.

At the commencement of hostilities, when the Naval Air Service was instructed to keep the Channel under the closest observation during the passage of the Expeditionary Force to



"CITTA DE MILANO" MANOEUVRING NEAR MILANO, 1914



S.S. AIRSHIPS, 1915

France, the Parseval and Astra Torres airships carried out most valuable patrols of long duration. During one of the patrols an amusing incident occurred, which I relate to show how little the Navy bothered to study airships before the War.

One of our coast patrol cruisers, with the Admiral on board, suddenly sighted one of our airships. They at once cleared lower deck, and placed below all surplus ammunition not required to fire at the airship, which they thought was a Zeppelin. A few days¹ after this incident, the Chief of Staff sent for me, and wanted to know what I meant by letting one of my airships go near this patrol cruiser, as the Admiral thought it was a German Zeppelin.

I said: "He couldn't possibly have thought that, sir, as it was the tri-lobed Astra Torres, commanded by Lieutenant-Commander Osborne,² and not in the least like a Zeppelin, and the Admiral, who had been Director of Operations at the Admiralty for two years, ought really to know the difference."

"Do not be absurd, D.A.D."³ was the answer. "How could you expect the Director of Operations to find time to go and look at one of your airships? What nonsense, indeed!"

Of course, the naval airmen were always wrong. After this I had a book of silhouettes of every aircraft—our own, allied, and enemy—specially prepared and circulated for guidance of those who had been too busy to spare a second to look at our airships.

Later, when the German submarine assumed a serious menace to this country, Lord Fisher held a conference in his room at the Admiralty, at which I attended with all my airship staff and also Mr. Holt Thomas, who was strongly advocating small airships to Lord Fisher. It was then decided to build a large number of submarine-searching airships (Plate 29), and Mr. Holt Thomas was given orders for a small airship of the Willows type, with propeller swivelling gear. This airship's

¹ 11th August, 1914.

² One of our ablest naval torpedo officers and expert airman.

³ Director of Air Department.

envelope was made of aeroplane fabric, heavily doped, and was not very satisfactory. But the swivelling gear worked well and noiselessly. No more of this type of airship was ordered, as the swivelling gear was found to be unnecessary.

The naval airmen produced a small airship by using a spare envelope of No. 2 Airship, and I slung underneath it one of the B.E. 2 C aeroplane bodies that Colonel O'Gorman had turned over to me from Farnborough. This makeshift airship was quite a success, and we then went full speed ahead to produce small submarine-searching airships for Lord Fisher. Squadron-Commander Neville Usborne was placed in charge of all the envelope work, as he had done such good service with the *Mayfly's* gas bags and outer cover. Squadron-Commander Briggs was placed in charge of the engine side, and with the good and valuable help of Commander Masterman, Wing-Commander Cave-Brown-Cave, Commander Woodcock, Major Waterlow, and our air mechanics, we soon turned out a large number of S.S. airships of approximately 70,000 cubic feet hydrogen gas capacity. The first S.S. envelope was built by that well-known aeronautical firm of Short Bros.

In carrying out trials with an S.S. airship at Wormwood Scrubs, I was alarmed one day at the Admiralty to receive a message that an S.S. airship under trial, through a defect in the engine that caused a breakdown, had collided with the *Daily Mail* airship shed, and had torn a hole in the envelope, and was then adrift, being rapidly taken across London, and the pilot was jambed in the car "upside down." I asked who it was, and it turned out to be Captain Denti, of the Imperial Italian Navy, who was helping us to get these airships through their trials. We got all the 'phones going, and soon had every car we could lay our hands on chasing the damaged airship. Civilians were most kind in helping with cars, and we rescued Captain Denti practically unconscious and took him to hospital. He was suffering from broken ribs, bruises, and had hurt his arm badly. Denti was a Sicilian, and about the hardest type of Italian one could find. When

PLATE 30



By W. Russell Flint, A.R.A.

"SS" AIRSHIP WARNING A FOOD-CARRYING SHIP OF
THE PROXIMITY OF A SUBMARINE

he was getting well, the Doctor said, "You are one in a million to come through like you have done. How do you account for it?"

Denti rolled his big eyes, and said, "Early piety, Doctor. You may not believe it, but I was always a very good midshipman, with possibly a leaning towards adventure!"

Denti had the most extraordinary ideas of speed. He had no fear. When we worked together in Southern Italy, during the War he used to scare me stiff—and after my submarine experiences I am not easily perturbed—by making his chauffeur always travel at top speed. Only after many trips, in which my hair used to stand on end, I discovered that Denti was most generous to his chauffeur, and insisted on giving him the best bottle of wine that could be procured. Whether this was done to make him drive fast I never knew. But I had a shrewd suspicion it was. Captain Denti was a great believer in air development, and I fancy, in pressing the needs of the air in his country, he experienced much the same treatment at the hands of a few of the Italian Noahs, for indeed, reader, there are Noahs in all services, in all countries, as some of us experienced at Whitehall.

Admiral Denti, unlike most naval pioneer airmen who have been discarded to the beach many years ago, is occupying a very high command in Venice,¹ and no doubt will climb higher still.

I have related that I feared the Forlanini airship might impinge on Milan Cathedral. One of our airships, "SS 27," was returning from a patrol, as shown in Plate 30, with the view of landing at Marquise. It was almost dark, and a church steeple suddenly loomed up so close to the airship that a collision could not be avoided. The pilot did his utmost, but the tail end of the envelope caught the church steeple and was completely torn off. This left the after-end of the car unsupported, and the airship collapsed and fell in the village street.

I followed up the S.S. airships with an improved coastal

¹ Page 381.

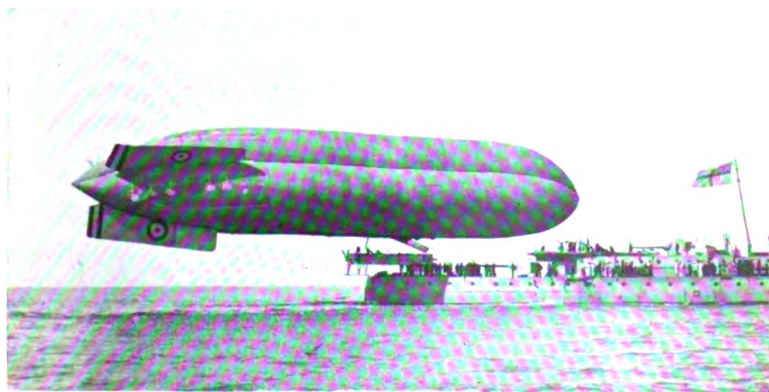
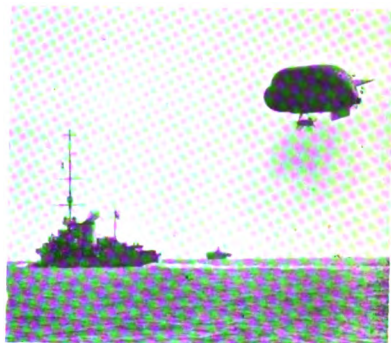
type, built on Astra Torres lines, and of 160,000 cubic feet capacity, and I got out, with Squadron-Commander Briggs's assistance, a double-ended chassis with two 180 h.p. eight-cylinder Sunbeam engines, placed fore and aft, for this class. We built about twenty-four of the "C" type (Plates 31 and 32), and then followed with a "Cx" and "North Sea" type, all following the Astra Torres tri-lobe form. The dimensions of these larger flexible airships is not without interest—

	Length	Width	Height	Capacity	Crew	Type
Cx	218 ft.	49 ft. 3 in.	57 ft. 6 in.	200,000 cub. ft. hydrogen gas capacity	5	Astra Torres
NS	262 ft.	56 ft. 9 in.	69 ft. 3 in.	360,000 cub. ft. hydrogen gas capacity	10	Astra Torres

We must have built nearly two hundred of these small airships, and some of them made good patrols of 24 hours' endurance. One, I recollect, made a record flight for a non-rigid of 61 hours 21 minutes. At first we had a good deal of trouble with dopes, but Commander Neville Usborne, by much ingenuity, got rid of the air bubbles that were so troublesome.

The part played by small British airships during the War in convoying merchant ships made them an exceedingly valuable addition to the naval patrols. Little was heard of them at the time, as their work had to be kept secret. They became in great demand by our food-carrying ships, and it is on record that no food ship or merchant ship was sunk by a submarine boat that had an airship escort. In addition, some enemy submarines owed their destruction to an airship sighting a submarine and then summoning the surface patrol craft. Whether an airship ever got a direct hit by dropping a bomb is not within my knowledge. But I know many bombs were dropped from airships on to underwater vessels, and I have

PLATE 31



COASTAL AIRSHIP "NO. 1" IN TOW FOR RE-FUELLING 1915

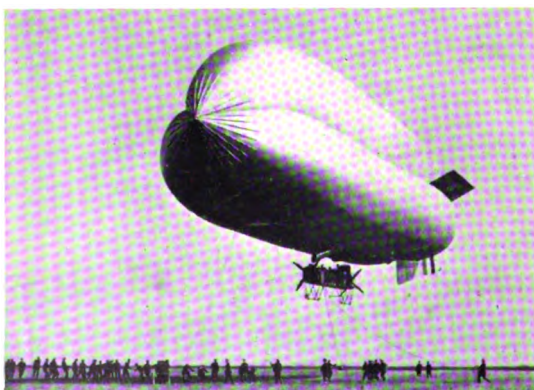
PLATE 32



" NO. 17 "



" NO. 18 "



" NO. 19 "

" COASTALS "

no doubt some were severely shaken by the explosion of the bombs.

They also searched for mines to report to the surface ships for destruction.

At one time I kept a very careful record of the mileage flown by airships in the Great War, and on looking up my records, find that during the four years our airships, including trial flights, covered just over two and a quarter million miles in the air, and the loss of life due to enemy action and accidents was 48 officers and men, which works out at not far short of 50,000 miles in the air per fatality.

The Naval Air Department supplied by request the Allied Governments of France, Italy and the United States with 24 airships, consisting of one North Sea type, five coastals, and the remainder S.S.'s.

RIGID AIRSHIPS

If you are going to carry weights and drive an airship at good speed through the air, flexible and non-rigid airships are unsuitable. You must have a rigid type.

After the wreck of the rigid airship *Mayfly*, the Admiralty decided not to continue the construction of rigids. This was against the advice of their airmen, as can be proved by the Minutes in existence.

Just before the War the German Zeppelins appeared to be doing well, much passenger service was carried out, and the Admiralty decided to commence rigid airship work once more, and when hostilities broke out No. 9 Rigid was in her design stages. Some of the girders were being constructed. Then it was brought to the notice of the Admiralty that munitions were of greater importance than airships, so the work on No. 9 was stopped, against the advice of the Director of the Admiralty Air Department (myself).

Some time afterwards, naval opinion afloat pressed heavily for rigids. This was owing to the activities of the German

Zeppelins in keeping the North Sea under close aerial observation, as can be seen by the wireless telegraphy interrupted signals that were plotted on charts. Rigid airships were again started, but they were developed too late to be of value in the War.

In the early days of hostilities, up to the Battle of Jutland, they would have been invaluable.

After the War, Rigid Airship No. 34, piloted by that intrepid and capable airman, Captain Scott, with Commodore Maitland on board, flew from East Fortune to New York in 4 days 12 hours, and took 3 days 3 hours on her return journey. This is the first time in history that an airship has crossed and re-crossed the Atlantic from Europe. Maitland was a most courageous pioneer airman; his parachute descents¹ were famous. He would drop from an airship perfectly unconcerned.

Just before he made one of his perilous descents with a parachute of no great efficiency, I asked him in a casual way what he thought of death? He gave me this characteristic reply—

"Oh, nobody should mind death. Why should anybody mind it? They should look upon death as a great adventure."

Poor Maitland lost his life at a later date in "R 38."

This airship was undergoing trials in the air, with a very gallant American crew on board in addition to our own crew. One of the last signals received was that the trial was nearing its close, and everything was going splendidly when suddenly the airship's structure gave way, the airship broke in two, and a great disaster occurred.

The Aeronautical Research Committee is my authority for saying that—

The airship "R 38" was originally intended for war service in the North Sea. An exceptionally high ceiling, viz., 25,000 ft. was called for to give safety from hostile aircraft. Moreover, the ship was to be capable of being built in the shed existing at Cardington and was to attain a speed of 60 knots.

¹ Maitland used a "Guardian Angel" parachute (static type) invented by a very talented man—Mr. Calthrop. Many lives were saved in the War by this type of parachute when used from kite balloons.

By these requirements a great advance on the performance of any German ship of which details were available was sought and a greater advance on that of any British ship. To meet these requirements certain new features were introduced.

There can be little doubt that the limitations of the shed at Cardington handicapped the naval constructors from producing a really good design.

The dimensions of " R 38 " were—

Length, 699 ft.

Diameter, 85 ft. 6 in.

Overall height, 93 ft.

Hydrogen gas capacity, 2,750,000 cubic feet approximately.

Speed, 70·6 miles per hour.

The Admiralty constructor, Mr. Campbell, who had nursed this airship, was a most conscientious man. I knew him at Barrow when we were building the *Mayfly*, and I am certain he had in mind that he would not hand this airship over to the United States officers unless he was certain she was structurally sound. Mr. Campbell had the helm put hard-a-port, then hard-a-starboard several times in quick succession during the last part of the trials.

The airship was not in her heavily-loaded condition. She canted, and torsional stresses came into play. These are always difficult to determine, under all conditions of inclination and loading.

This helm action appeared to have found out a weakness, and the frail structure collapsed with disastrous results.

" R 38 " was designed by Admiralty constructors, and Mr. Campbell gave his life in carrying out his duty most conscientiously. Perhaps the factor of safety in some particular condition of the ship was too low.

In the report on the accident to " R 38," by the Accidents Investigation Sub-Committee, I take the following from their finding—

(a) That the accident was due to structural weakness in the design of the airship.

(b) That during the final flight no loads were imposed in excess of those which might have occurred during the normal navigation of the ship in weather which might reasonably be encountered.

(c) That, having regard to her size and speed, " R 38 " was considerably weaker than previous British rigid airships.

(m) That the terms of the requirements laid down in time of war for " R 38 " were drastic and imposed too severe a task on the designers.

(p) That on the assumptions made, the structure was designed with great skill and the necessary calculations were carefully carried out by methods admitted as sufficiently accurate in other branches of engineering practice.

The late Lord Rayleigh informed me that he knew nothing more difficult than the problem of calculating the stresses, particularly the torsional stresses, of a rigid.

It would be absurd to blame the Admiralty for this air disaster.

We have to learn, step by step, and make renewed efforts to solve these problems, and not, as " Neon " advocates, run away from them. Neither will throwing bricks help to their satisfactory solution.

Mr. Pollen's reasoning¹ " that Zeppelins were useless as sea scouts " shows an extraordinary obsession. That is what they were most useful for. Reconnaissance took precedence over everything else. No sooner had we laid a minefield in the North Sea than the Zeppelins located its exact position and then summoned the surface craft to sweep up the mines. It is common knowledge that this was one of their most important duties, and surely a most valuable one. The bombing of London and other places in this country was a sop to the popular clamour and political pressure in Germany to have a knock or two at the people in this country who were so safely and snugly outside the war zone. I have always understood these raids on England were against the advice of the very brave German airship captains. I will support my contention that the German Zeppelins were of great value as sea scouts by the following.

¹ *The Great Delusion*, Preface.

In the personal experiences of Colonel Repington, in his book,¹ the following passage is of considerable interest when considering airships—

I asked about the dirigibles. D.B. (David Beatty) says that the enemy has still the monopoly of the best air scouting in good weather, when one Zeppelin can do as much as five or six cruisers.

When the Fleet came here from Scapa it was accompanied by some of the new small dirigibles. But D.B. (David Beatty) could not wireless to them as wireless masts were down during the move.

They pitched and tossed a good deal but D.B. (David Beatty) hopes they may be of use some day.

The large dirigibles have not yet come along and B. (Beatty) thinks that they have been messed about and people do not appreciate their importance even now !

I do not think Lord Beatty would have spoken like this unless he had seen what a great disadvantage he was placed in by having no aerial reconnaissance when the Germans in fine weather kept the whole North Sea under close observation with their naval Zeppelins. But Mr. Pollen remarks—

In the late war Germany alone had long distance airships, and both on land and sea their failure was complete.

Lord Beatty did not appear to hold this opinion ! And I suppose he knew what he was talking about.

And Colonel Repington quoted an Admiralty air officer in 1916 who gave this opinion—

He did not think it could quite be said that the Zeppelins had no military effect, for they caused work to stop, held up the railway for 30 hours sometimes, and made all the workmen run home to look after their families.²

The same Admiralty officer, deploring that we had no naval Zeppelins, said—

As a result our Navy was now blind and the Germans had an enormous advantage over us. The Zeppelins could see up to seventy miles on a clear day, and whenever any of our ships put out, their numbers, type and course were immediately reported to Germany.

¹ *The First World War*, by Colonel Repington, Vol. II, pages 13-14.

² *Ibid.*

They held us under constant observation and so, knowing where our ships were, could slip over when they pleased and carry out such attacks as that at Lowestoft.

It is of interest to record that I put forward a minute to naval authority on the 5th April, 1916, stating that for the last six years the responsible air officers have advocated building rigid airships,¹ but have never been able to obtain much support.

Lord Jellicoe's opinion of rigid airships is as follows—

The German Zeppelins as their number increased were of great assistance to the enemy for scouting, each one being in favourable weather equal to at least two light cruisers for such a purpose.²

In further reading Lord Jellicoe's most interesting book, I find, in dealing more specifically with "Jutland," he observes—

Shortly after 3.30 a.m.³ the report of gunfire to the westward was audible in the Battle Fleet, and at 3.38 Rear-Admiral Trevelyan Napier, commanding the Third Light Cruiser Squadron, reported that he was engaging a Zeppelin in a position to the westward of the Battle Fleet. Course was altered "by divisions" to the west at 3.44 a.m. as it seemed that the presence of the airship might possibly indicate the presence also of the High Sea Fleet. At 3.50 a.m. a Zeppelin was in sight from the Battle Fleet but nothing else: course was altered back again to north and fire opened on the airship which, however, was too high for the fire to be effective. She disappeared to the eastward. She was sighted at subsequent intervals.

Then, again, Lord Jellicoe observes—

Our position must have been known to the enemy, as at 2.50 a.m. the Fleet engaged a Zeppelin for quite five minutes during which time she had ample opportunity to note and subsequently report the position and course of the British Fleet.⁴

There can be little doubt that the German Zeppelins, by reporting the position of the Grand Fleet, enabled the German Fleet to escape from further action.

¹ Zeppelin type.

² *The Grand Fleet*, by Lord Jellicoe, page 32.

³ 1st June, *The Grand Fleet*, 1914-16, page 385.

⁴ Pages 489-490.

Admiral Harper, in his famous book, informs us that shortly after 9 p.m. on the day the Jutland action took place—

Scheer asked for an airship reconnaissance near Horns Reef at daylight. Here was a definite indication of Scheer's intended route home.¹

I am the one man in England who has most earned the right to ask the Admiralty where were our British Zeppelins at Jutland? Why did we not have rigid airships for reporting Scheer's movements the morning after Jutland?

Admiral Beatty² says they were messed about. By whom?

After the wreck of the *Mayfly* in 1911, I begged every Sea Lord to continue the development of rigid airships in exactly the same way as we developed submarines. Shortly after I gave up the command of "A 1" submarine in 1903, she was lost off the Nab Light Vessel by collision with a merchant steamer, the *Berwick Castle*.³

What did the First Sea Lord at that time do? Lord Fisher wisely ordered more manoeuvres and more submarines to be built.

What did the First Sea Lord do after the *Mayfly* accident? He did not follow Lord Fisher's big example. He ran away from airship development, and even after he had ceased to be First Sea Lord he opposed airship development when serving on the Committee of Imperial Defence, and although this Admiral, a great master of naval strategy and tactics in his time, and second to none as a fine type of naval officer, has passed away from us, I am bound to record that his opposition to rigid Zeppelins deprived the Navy and the Fleet he had served so faithfully and assiduously for so many years, in command of the Channel and Home Fleets, of the very means of making efficient aerial reconnaissance that would have proved of marked value in the North Sea during the War period.

¹ *The Truth about Jutland*, by Rear-Admiral J. E. T. Harper.

² See page 129.

³ See pages 150-5 in the *Evolution of the Submarine Boat, Mine, and Torpedo*, by the Author.

Acting in accordance with the wishes of Colonel Seely, then Chairman of the Sub-Committee of the Committee of Imperial Defence, dealing with air matters, I went, when on half pay in the summer of 1912, with Colonel Mervyn O'Gorman to study airship development in France, Austria, and Germany, and, if possible, take a flight in a Zeppelin. We examined the whole airship position in those countries, and after much difficulty, and having to masquerade as Americans, we succeeded in getting a trip in the German commercial Zeppelin, the *Victoria Luise*. We flew over Hamburg, Bay of Lubeck, and up and down the Elbe for about 5½ hours in the *Victoria Luise*. This airship was then the latest design, having been commenced in 1911 and completed in the early months of 1912.

Her length was 485 ft. and her hydrogen gas capacity was 664,000 cubic feet.

Our report is on record with the Committee of Imperial Defence. We drew the attention of the Government of the day to the great advance then being made in Germany with rigid airships and the necessity for this country to seriously look into the airship question. Captain Watson¹, then our very able Naval Attaché in Berlin, in many dispatches pressed the necessity of developing this type of airship.

But all our efforts fell upon deaf ears.

Any unbiased critic of the future who studies how the North Sea was kept under aerial observation in fine weather by the German Zeppelins and examines the intercepted wireless telegraphy signal charts with the positions of the Zeppelins plotted thereon, will agree with me that the Sea Lords in office from 1909 onwards were unwise to allow Germany to possess a scouting craft that we did not possess ourselves—vessels that some German authorities have computed to possess in fine weather the value of eight cruisers. The responsibility for the lack of adequate aerial observation in the North Sea during the War period does not lie with the naval airmen, but with those Admiralty administrators from 1909 onwards, who lacked vision.

¹ Now Admiral Sir Hugh D. Watson, K.C.B., C.V.O.

The German Zeppelin airships also worked in the Baltic, and it is recorded that one of these airships, "LZ 120," in 1917 remained in the air 101 hours, from 26th July to 31st July, and landed with enough fuel for another 36 hours' flight.¹

There are a certain number of definite mis-statements in "Neon's" book² that need the probe, such as "No airship yet has ever attempted a commercial task."

The German airships before the War were a practical proposition. In our trip in the *Victoria Luise* in 1912, in addition to carrying 20 passengers, they had the civil crew and a German naval crew under training for naval reconnaissance purposes. Also they carried a tremendous amount of food. The German passengers ate sausages and drank champagne alternately for most of the 5½ hours' flight. Both Colonel O'Gorman and myself were amazed at what was consumed. The good ozone over the Bay of Lubeck no doubt gave them a big appetite for appreciating the good fare of the Fatherland.

I understand the German airship *Bodensee* covered in 1919 32,000 miles in 103 flights, carrying 2,450 passengers, and in something like 2,000 flights made by five German airships between 1910 and 1914, carrying 42,000 passengers, not a single mishap occurred to a passenger. In the *Victoria Luise* we had a large saloon. Bunks for travelling could easily be fitted, and this was in 1912.

Why does "Neon" select a small airship like the *Norge*, of length 347 ft., diameter 60 ft., height 79 ft., and 670,000 cubic feet hydrogen gas capacity, to illustrate the degree of comfort available in airships? One might just as well select a small intermediate passenger steamer and say all ocean travel was similar.

The *Norge* was chosen because she could be easily handled in Spitsbergen and Alaska, and also that unlimited funds were not available for the very gallant exploring party taken by Captain Amundsen. They wisely chose an Italian airship as

¹ *Air*, December, 1927, page 22.

² *The Great Delusion*, Preface.

being most efficient and one that could be obtained at a moderate price. The *Norge* carried out her objective, flew over the North Pole, successfully landed without any mishap to the very gallant explorer, pilot, scientist, and crew.

Captain Amundsen and Colonel Nobile,¹ the brilliant designer, builder, and pilot, are to be most warmly congratulated on this successful Arctic air feat in flying from Spitsbergen to Teller, in Alaska, a distance of 3,393 miles, with enough fuel remaining for another 1,000 miles.

The *Norge* had to land sooner than was intended, as the ice thrown off by the propellers damaged the fabric envelope. Before landing, Sergeant Ettore Arduino dropped in a parachute and marshalled the local inhabitants to bring the airship to rest.

The *Norge* was deflated at once and dismantled, then shipped home in sections. Amundsen and his crew suffered chiefly from lack of food and sleep.

This Arctic flight demonstrated the feasibility of the Polar route for travel between Europe and the Orient.

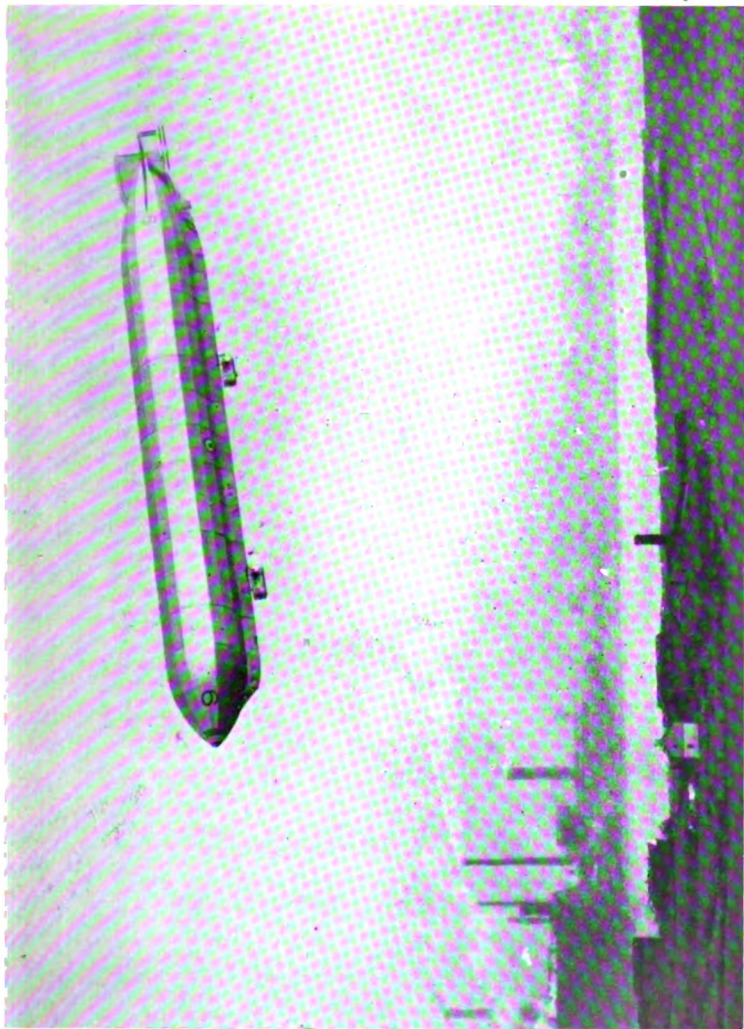
It is unfortunate that Neon makes observations such as this—

That an airship has no longitudinal stability without her engine working.

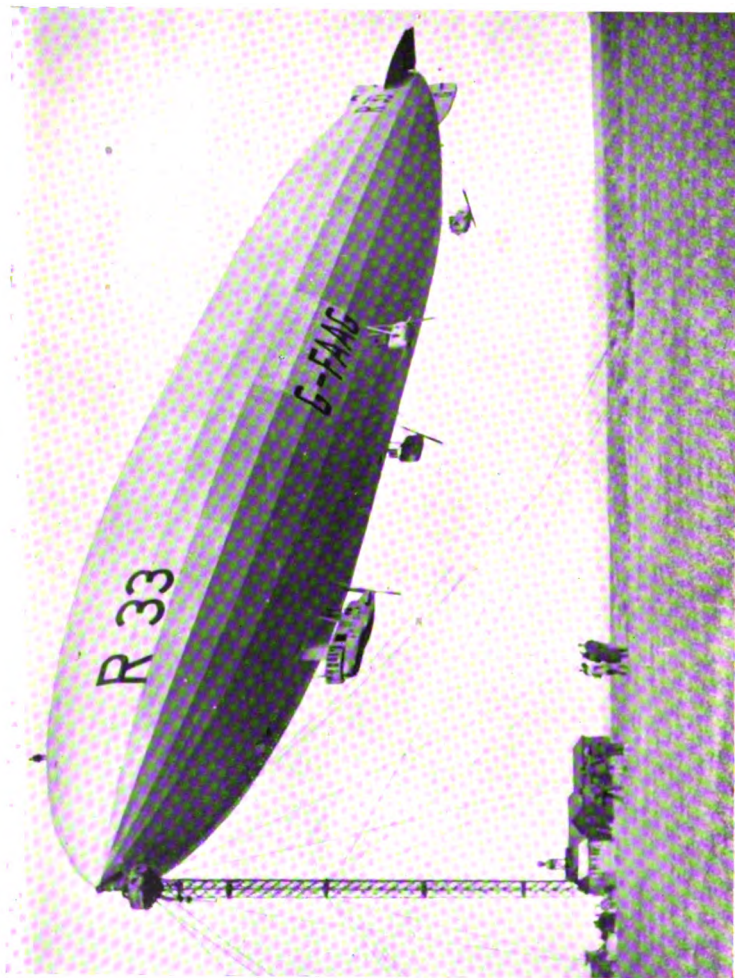
I have flown in a good many airships, Zeppelins, semi-rigid, and non-rigid types, and this statement is not correct. In the early days we often used to break-down in the air. I much preferred the longitudinal stability of the airship to that of the small Holland submarines when running submerged, which was indeed questionable. No. 9 (Plate 33), was quite stable.

Attention is called to this passage in "Neon's" book : "The negligible carrying powers of airships renders them

¹ Colonel Nobile has won world-wide fame as a skilful aeronautical engineer. His airships have done useful work wherever employed. Some accidents have occurred with them in Japan, but airship work for naval purposes in that country is in its infancy. For patrol work in the inland seas of Japan nothing can beat the small airship.



"NO. 9" RIGID AIRSHIP MANOEUVRING OVER WALNEY ISLAND, BARROW-IN-FURNESS



(Topical Press)

"R.33" ATTACHED TO MOORING MAST

useless for transport of aeroplanes.”¹ “R 33” has already carried with great success two service machines and a very large quantity of petrol on board.

A good instance of the partial state of “Neon’s” mind is this.² Because an airship cannot see steamships on the sea because they are not there, and is only able to see an iceberg which is there, it is inferred that this is a disability on the part of the airship. In one of the quotations the conditions are stated to have been perfectly clear blue sky and deep blue sea, visibility at its maximum. When cruising over the Bay of Lubeck, in the German Zeppelin *Victoria Luise*, I could see quite easily all shoal water at 3,000 ft., and when overland deer running through the corn at 2,000 ft. If “R 34” did not sight a ship when the weather conditions were favourable, it is obvious no ship was within her arc of visibility.

“Neon” insists that airships on the route to Australia must fly through the Java thunderstorm area.

Do surface ships always steam or sail through the maelstrom, a whirlpool situated off the coast of Norway, near the Lopodon Islands? It is known to be perilous at certain states of the wind and tide.

If I was navigating a submarine or destroyer off that coast, as a prudent measure I would give the maelstrom a wide berth, though at times I know it can be crossed without much danger.

Similarly, in navigating an airship, it surely would be prudent on the part of the navigator to give the Java thunderstorm area a wide berth.

Why should not air navigators, when properly trained, have as good judgment as surface ship navigators?

Why is it considered that working in a single medium puts the airship at a disadvantage as compared with seagoing ships, which work in a double medium, is not made clear. Might I not equally well argue the opposite?

A great deal is written about the difficulties of navigation.

¹ *The Great Delusion*, page 6.

² *The Great Delusion*, page 99.

Airships have now made some long-distance flights. "R 34" and *Los Angeles* have crossed the Atlantic. A German airship in the War made a considerable flight to Africa and back. Another made a great duration flight in the Baltic, and one of our naval non-rigids carried out a patrol of over 60 hours in the air.¹ The German Zeppelin raids, carried out mostly in the dark hours, are also good examples of ability to navigate.

Mr. Pollen² informs us that when "R 33" broke away, she was saved by a lucky shift of wind. Surely this is not quite correct? I followed this accident very closely, and was informed that the airship's flying staff, by keeping in close touch with their meteorological experts, were able to guide the airship by wireless telegraphy signals in making the most of the gradual change of wind caused by the movement of the depression in which she was. The officer who found himself unexpectedly in command, Flight-Lieutenant Booth,³ kept his head splendidly, and saved his ship and crew in difficult circumstances. (Plate 34.)

As airship services are developed, more harbours or mooring towers will be established, and be available in times of emergency. A base in Northern Europe would have enabled "R 33" to have landed after a flight of a few hours only.

The tide tables, laws of storms, etc., as applying to surface vessels, have been built up by years and years of patient labour by experts all over the world. Surely, then, it is not unreasonable to suppose that the same study of the conditions in the lower stratas of the atmosphere in the England, Egypt, India, Australia, South Africa and Canadian air routes will have to be considered for the use of airmen navigating all types of aircraft, so that they can be guided in the same way as the seaman is in the normal conditions expected. The meteorological staff are not fools; they and the airship staff realize the importance of wind currents, both permanent and otherwise, and that is why they are analysing the lower strata of the

¹ See page 124. ² *The Great Delusion*, Preface.

³ Now Squadron-Leader Booth, A.F.C.

atmosphere in the area of the England-Egypt-India route for every day of the year, in order to discover what are the normal conditions to be expected.

With regard to establishing an airship's position by observation of the heavenly bodies, there is no more difficulty in this than that which is experienced by a surface ship. In navigation waters a ship can run a line of soundings. But in open waters, if land is not in sight, she has to depend on observation of sun, moon, or stars, to fix her position. If these are obscured, she has to depend on dead reckoning. The surface ship is, then, in no better position than the airship. In some respects, airships have a greater advantage, as there are no rocks or shoals in the air, and if he keep well above mountains, there is nothing to worry the navigator.

The answer to all "Neon's" arguments about the effect of permanent winds, configuration of ground storms, etc., on airships and their regularity is that the best routes to follow can only be definitely ascertained as a combined result of an adequate meteorological organization and experience of flying over the routes concerned. This is following the precedent of the gradual evolution of all the available data for the guidance of the navigator on sea routes.

Owing to financial stringency after the War, all airship work was unfortunately abandoned. But I repeat this is not the airship's fault, and only observe that this policy of once more "Backing and Filling" makes it a costly matter to restart again. The airship men must not be blamed for that.

It is the fashion in certain political circles to say nothing good came out of the Labour-Socialist brief period of office. I always admired Mr. Ramsay MacDonald's action over the cruisers, when he said we could not let the Navy rot from bottom to top.¹

Also Lord Thomson, when Air Minister, in my opinion, came to a wise statesman's decision in advising his Government to carry out an airship experiment to really try the capabilities

¹ See page 83.

of this type of aircraft. He wanted no monopoly to be given to one firm, but decided that the State should be given the task of building one airship of 5,000,000 cubic feet hydrogen gas capacity, and another of similar gas capacity he gave to the Airship Guarantee Co., generally associated with the name of my talented colleague, Commander Burney,¹ of Paravane fame.

This is the first time in history that the airship problem has been approached in a really scientific manner, and plenty of time has been available to try out every detail of construction.

The approximate dimensions of "R 100" are length 709 ft., diameter 131 ft., height 132 ft.; and those of "R 101" are approximately length 731 ft., diameter 131 ft., height 141 ft.

The whole case against airships, which admittedly exists until the airship men are able to demonstrate with the help of a good meteorological service what they are capable of, has been cleverly manipulated by the inspirers of "Neon" in a superficial manner. The programme of the new airships, Nos. 100 and 101, is entirely experimental.

Nobody can state positively that airships will or will not be made a commercial success, because nobody knows.

Those who know most about airships and have been proved right can say that if they had been listened to, and airships had been developed as sea scouts, the naval side of the War would have shaped more to our advantage.

Take the case of submarines. Suppose I took the accidents from the first dive I made with No. 1 Holland submarine, and tabulated them, it would be possible to make out a case to infer that they were useless. But, on the other hand, enemy submarines nearly brought this great nation to her knees in the War, by sinking 6,635,059 tonnage of British merchant ships,² because the Admiralty were unwise in not studying the menace of the submarine. There is plenty of evidence to show they were well warned and that little or nothing was done before the War to combat the underwater vessel.

¹ Member of Parliament for the Uxbridge Division.

² *Hansard*, 18th July, 1927, cols. 23-24, also page 394.

I have made in the House of Commons some criticisms on the design of "R 101," as I was informed that she would have no radial bracing wires between the gas bags, as is the Zeppelin practice.

The Under-Secretary for Air, Sir Philip Sassoon, handles questions extremely well. If he does not know the answer—and there is no reason why he should know details such as radial bracing techniques—he always sends a written answer in a few days, giving a reasoned reply from his advisers. All Members of Parliament like his method of procedure, and it helps them to keep in touch with the work for which they have to vote the taxpayers' money.

I was doubtful about such a radical departure as omitting this radial bracing, and with the permission of the Air Minister visited Cardington¹ to see what was being done. Lieutenant-Colonel Richmond, the able designer of "R 101," kindly went through the drawings with me, explaining every detail of the really scientific gas bag holding-down wire system he has evolved. This dispenses with radial bracing, and from experiments with a full-sized section containing an inflated gas bag at different angles, it was proved in a practical manner to be a complete success. The depth of the girder, with its component parts built up of stainless steel tubes and duralumin struts, made my mouth simply water. If we had had that design for the poor old *Mayfly* she would not have collapsed through structural weakness in the way she did.

From a close study of Colonel Richmond's design, there is no doubt that there is a certain advantage in respect of strength which is derived from increased size.

I have been intimately connected with the building of the *Mayfly*, No. 9 Rigid, and many other types of airships at the Admiralty, and may I assure "Neon" that the use of different metals for the structure of "R 101" is not a "striking and disquieting feature."² Composite girders composed of stainless

¹ 15th June, 1927.

² *The Great Delusion*, page 16, footnote 3.

steel tubing with duralumin struts are used, when a saving of weight is effected by substituting this material for duralumin.

These girders are most scientifically designed, and need cause "Neon" no alarm.

All modern rigid airships are designed to have a sufficient factor of safety with one gas bag deflated. It is not correct to say, in a design like "R 101," with its scientific method of containing the gas bag, that if one gas bag is deflated then the neighbouring bags have to be deflated.

If things go against you in the air, tank after tank has to be jettisoned.¹

I can assure the inspirer of "Neon" that if he had followed airship development he would know that there are very few recorded instances of this having taken place. As far as I am aware, the cases of tanks being jettisoned have mainly occurred in connection with Zeppelin raids, where great height had to be obtained. I know of no case in which a gas bag was deflated at a mooring tower necessitating jettisoning tanks. One of "R 33's" gas bags deflated in flight, and the airship landed at the Pulham Tower, when a new bag was fitted; in this case no tanks were dropped.

I can find no detailed reference in "Neon's" book of the fine flight of the *Los Angeles* (Zeppelin type) from Germany to America without any mishap and plenty of fuel in hand. It may be presumed the weights were carefully worked out by the aeronautical designer to enable this long flight to be done successfully. The only mention made is: "The *Los Angeles*, the latest airship completed, 2,400,000 cubic feet capacity, arrived in New Jersey from Germany in October, 1924."

Aeronautical engineers are not necessarily more stupid than normal folk, yet Mr. Pollen would have us think so, for he remarks, in reference to building "R 100" and "R 101"—

Just as if everyone did not know that the proposed ship cannot even theoretically carry the proposed weight.

¹ *The Great Delusion*, Preface.

A wild statement of this nature is based on ignorance, and the constructors, who are able men, can demonstrate with not the slightest trouble that this is quite incorrect.

"Neon" criticizes the airship in the following words: "In airship transport the effort is enormous—the whole result in useful load is negligible." Then he goes on to quote figures to prove this statement, some of which are wrong and others misleading. Moreover, "Neon" tries to prove the case against the airship based on such figures as are obtainable for the two airships now building, which are the first of a completely new type and greatly increased size.

The contract with the Airship Guarantee Co. stipulates that the "fixed weights" are not to exceed 90 tons. I agree with "Neon" that in the airships now building this weight will certainly be required. These airships are such a radical departure from previous airships in size that it is the declared official policy that strength must be considered of paramount importance, even at the expense of performance. To base the performance of future airships on the actual performance of these ships is clearly misleading, but the experience gained from the trials of the ships will indicate the lines along which savings can be made in "fixed weights" of future ships.

Quite apart from the strength aspect, however, past experience has shown that improvement in detail design in repeat ships leads to considerable saving in weights. I would not consider a possible saving in future ships of 5 per cent on the 90 tons as an unreasonable forecast, and this would amount to $4\frac{1}{2}$ tons.

As I have said, however, the whole future of airships cannot be judged (in the manner adopted by "Neon") on the weights of these first airships.

For the present we will take the fixed weights at 90 tons, and see what performance may be expected.

The ballast required for the long flights which these ships will carry out should not exceed eight tons. "Neon" assumes that 15 tons will be necessary, and states this must be carried

as "regulation ballast." This is not correct; the 15 tons has been laid down as the ballast tankage to be supplied, and the actual ballast carried will in part depend on the route being flown, but, as I have said, this should not exceed eight tons.

The number of crew carried for regular commercial flying will naturally be reduced to a minimum. It is not thought that so many as 50 will be required, including stewards, as no doubt crews in a commercial airship service will work in two watches only, and will be changed at regular intervals. In any case, "Neon's" estimate of 300 lb. per man is unnecessarily liberal, and 200 lb. is obviously sufficient. I propose to allow $4\frac{1}{2}$ tons for the crew, which is clearly an ample allowance.

If the average weight of a passenger is taken as 160 lb., it will be seen that a total weight of $12\frac{1}{2}$ tons for 100 passengers would allow for food, etc., and about $\frac{3}{4}$ cwt. of free baggage each.

The lift allotted for mails, etc., is 10 tons.

If the above weights are added to the "fixed weights" of 90 tons, it will be seen there is a total weight of 125 tons, which, when subtracted from the gross lift of the airship, taken by "Neon" as 150 tons, leaves 25 tons, which is left over for fuel.

I have put my statement in this way intentionally, to bring out what is the real point: How far will this 25 tons of fuel take the ship, with the necessary reserve to meet adverse weather conditions? Clearly this must depend on the route being flown. I believe, on good authority, that a fuel consumption of one ton should be sufficient to drive the ship at a speed of 60 miles per hour for $2\frac{3}{4}$ hours. Twenty-five tons would, on this figure, give the ship an endurance of nearly 70 hours, or 4,200 miles in still air. This should prove quite sufficient for the England-Egypt route, when operating commercially in the future.

But it is, of course, linked up with the question of the best size of airship for operating a given route economically, a matter which can only be settled by actual flying experience on the route.

"Neon" points out that allowance must be made for obtaining flying height at the commencement of a journey, and states this would mean a loss of carrying capacity of about nine tons in the present size of airship.

In forecasting that in future airships there is a possible saving of $4\frac{1}{2}$ tons in fixed weights, I have not mentioned the question of a reduction in the amount of ballast carried. This can be done by recovering water from the exhaust of the engines, and there will undoubtedly be an early development in this connection in commercial airship flying. An apparatus is already in use in America where the conservation of helium is important owing to its high cost compared with the cost of hydrogen. A water recovery apparatus would enable a saving in ballast carried of some three to four tons.

Sufficient has been said to show that a really useful commercial and military performance for 5,000,000 cubic feet airships is definitely in sight, and that a statement that an airship's useful load is negligible cannot be substantiated, even in respect of the two admittedly experimental ships now under construction.

A former distinguished member of the Royal Corps of Naval Constructors, Mr. E. F. Spanner, is giving us a fine series of books; each one, if I may say so, is more interesting than the last. Some of his opinions I agree with, but many I most profoundly disagree with. In his latest book, entitled *This Airship Business*, I take the following passage¹—

Of one thing only I am quite definitely certain and that is that the Air Ministry do not intend to fly their own ship until they have either broken Burney's airship or else proved that all the criticism advanced against airships are wrong and that "the conquest of the air" simply awaited the arrival of Sir Samuel Hoare, Lord Thomson, the new airship experts—and Commander Burney. If they break Commander Burney's ship, as I am satisfied they will, the whole weight of blame will be permitted to fall upon his shoulders.

The public will have no more airships. The Air Ministry heads and experts will bewail the premature stoppage of their schemes and

¹ *This Airship Business*, pages 360-1.

the public will be copiously doped with data to prove that Burney was wrong and it was a thousand pities that the Air Ministry's own ship was not first in the air.

On reflection, I think Mr. Spanner will see that the above statement is most unfair to the present and past Air Ministers. Both Sir Samuel Hoare and Lord Thomson are the very last men to attempt in any way to claim "the conquest of the air." Neither are the Air Ministry experts or Commander Burney likely to do so.

Nearly all pioneer air work has been carefully recorded, and the present airmen are not likely to forget the work of those who bore the heat and burden of the day in the first air efforts. Commander Burney, M.P., in an interview with the aeronautical correspondent of the *Morning Post*, as published in their issue of 11th January, 1928, disclosed that—

"R 100," the five-million cubic feet airship now nearing completion at Howden, Yorkshire, is to be acquired from the Government by its designers and constructors, the Airship Guarantee Company, of which Commander Burney is the head.

Its acquisition will be the prelude, subject to its trials being satisfactory, to the establishment of a £7,000,000 Atlantic airship company, and the running of airships between Britain and New York and Canada every other day.

The new airships to be built will be of greater performance than any previously contemplated, and they will embody improvements which it is contended will make an Atlantic airship service immediately feasible.

The "R 100" should be completed within a few months, the flying trials are expected to take place in July or August, and it is our intention to purchase the vessel and run demonstration flights between Canada, the United States, and Great Britain.

If these demonstration flights are successful we intend to form an Atlantic Airship Company to operate an alternative day service between England and North America, and the estimated time taken will be 48 hours from England to North America and 38 hours from North America to England, the difference in time being accounted for by the prevailing westerly wind.

The voyage from England to North America will sometimes, and perhaps more often than not, be southwards, via the Azores, and sometimes to the north, passing north of Newfoundland.

I have arranged with the British Postmaster-General for the carriage of the British mail upon the basis of making a surcharge over and above the normal charge of approximately sixpence per ounce letter and two shillings per lb. for parcels, and am now going to discuss matters with the United States and Canadian Postal Authorities to ascertain if a similar arrangement can be made for the United States and Canadian mail.

As regards passenger fares, our proposals at present are to charge £80 per berth in a four-berth cabin, £100 per berth in a two-berth cabin, and £120 for a single-berth cabin, as soon as the regular service is inaugurated.

As soon as the Atlantic demonstration flights are completed, "R 100" will be operated upon the England-Egypt route—and as soon as experience has been obtained upon this section of the route I have little doubt that her trips will be extended to India.

Bombay will be made non-stop in 52 hours, and from Bombay to Fremantle in 48 hours, bringing Australia to within five days of England.

With such an energetic and capable man as Commander Burney pressing on airship development, I cannot help feeling that airships will soon come into their own.

If it is possible to succeed with airships, Burney will achieve success, and win the admiration of his countrymen in persevering with airship development in the face of much hostile criticism. Should he fail, he will have the satisfaction of having made a big endeavour to solve a great air problem.

The Chairman of the House of Commons Estimates Committee was my able colleague, Colonel Sir Vivian Henderson, M.C.¹ In the recent report of this Committee they have compared the expenditure on the construction of two airships. "R 100" is being built under contract for £350,000, for delivery by 30th September this year. The Committee have no observation to make on the terms of the contract. "R 101" is being built by the Ministry at Cardington.

In July, 1924, when the present scheme was initiated, this station was valued at £302,000. It was stated to the Committee in evidence that "R 101" would cost something like £400,000.

¹ Member of Parliament for Bootle.

To this must be added £100,000 for the enlargement of the old shed and £50,000 for a mooring mast. A further £145,000 is being expended on a new shed required for housing the airship being built under contract.

Expenditure on this can be excluded from any comparison of the cost of the two ships. Even if the £50,000 for the mooring mast is also excluded, the ship being built by the Ministry will cost at least £150,000 more than the one being built under contract.

The Committee realize that the proposal to build one airship by contract and one at Cardington was approved by Parliament, but they consider it their duty to draw attention to the comparative costs to the Exchequer of the two ships.

I may remind Sir Vivian Henderson that you cannot close airship construction down entirely and then re-start it again without considerable expenditure. The State airship "R 101," being built at Cardington, is bound to cost more than Commander Burney's design, as it is quite a new departure in rigid airship construction. Many of the new features have had to be tried out by costly experiments. No similar design has ever been constructed before.

I notice in a recent number of the *National Review* that Mr. L. S. Maxse sees no good in airship development, and repeats "Neon's" "R 101" figures, that are many tons out, and then observes—

The Americans, who in all conscience are rich, enterprising, inventive, courageous and determined to the point of making a god of success and who regard failure as a crime, have been so discouraged by such calamities as that of the *Shenandoah* as to have practically abandoned the construction of airships.

My information differs somewhat from this sweeping statement, as I understand that the Americans are proceeding keenly with airship development, and under the five year expansion programme for the United States Air Service there were authorized in 1926 one medium-size metal clad airship and two 6,500,000 cubic feet rigid airships. For these latter large

vessels a design competition has been already held and a prize awarded. The American Navy Air Service estimates for the financial year 1927-28 make provision for a first instalment of £40,000 towards the construction of one of them. There is, further, in these estimates, a large item for helium, whilst the estimates of the Bureau of Mines contain a provision of over £200,000 for the acquisition of helium-bearing land and general investigation into helium.

The United States Navy Department has been engaged, states *Engineering*, "in preparing a preliminary design for two new airships and in carrying out the necessary model experiments for the purpose of obtaining a form of hull possessing the most efficient aerodynamical qualities. According to reports in the American technical press, the dimensions arrived at from these calculations and investigations were: Length 780 ft. and diameter 135 ft. These figures compare with 680 ft. and 658 ft., and 79 ft. and 91 ft. in the *Shenandoah* and *Los Angeles* respectively, and with 730 ft. and 130 ft., the published figures for the two new British airships,¹ whose capacity is, however, 1,500,000 cubic feet less. The fineness ratio, i.e. length to diameter ratio, for the new airships will thus be appreciably less than for the two previous United States vessels, but slightly greater than for the British."

Another step towards the construction of the two airships has recently been taken by the Navy Department, who have invited several firms to forward designs and tenders for the construction of one or both vessels or any separate parts for them. These are to be forwarded to reach the Department not later than midnight, 16th May next, and will be examined and reported upon by a special Board appointed for the purpose by the Secretary of the Navy. The airships must be constructed within the United States, either by American citizens, or by companies or corporations, of which not less than three-quarters of the stock is held by American citizens, and whose directors are wholly American. The tenders are to include a separate

¹ See page 138 for approximate dimensions of "R 100" and "R 101."

price for the design, and in the event of the necessary funds not being available to proceed at once with the construction of the vessels, the successful design will be purchased by the Navy Department at a price not exceeding 50,000 dollars.

The outline particulars upon which the designs are to be prepared state that the airships, being primarily intended for scouting at sea, must possess a large endurance. They are to have machine-guns mounted on them, and are to be fitted for carrying aeroplanes and with the necessary fittings for releasing and receiving them whilst in flight. The ships are to be designed for helium as the buoyant gas, but the possibility of using hydrogen or a mixture of the two gases must be considered and arranged for in the designs.

The gas capacity is not to exceed 6,500,000 cubic feet, and the overall length, height, and beam 780 ft., 155 ft., and 135 ft. respectively, the limiting length and beam—or diameter—agreeing with the figures given above. The maximum speed is not to be less than 70 knots, and the endurance at a cruising speed of 50 knots not less than 6,500 nautical miles.

In January, 1928, the 658 ft. rigid airship *Los Angeles* made a successful flight and landed on the deck of the United States Seaplane Carrier *Saratoga* when this ship was some hundred miles off the coast of Rhode Island.

Rear-Admiral William A. Moffet, Chief of the Bureau of Aeronautics of the United States Navy, was most enthusiastic that this experiment demonstrated the practicability of refuelling large rigid airships at sea, and so extend still further their already great range as sea scouts.

The *Aeroplane* informs us that, according to French reports, the Zeppelin Works hope to complete "LZ 127" shortly.

"LZ 127" is said to be a ship of 105,000 cubic metres (3,800,000 cubic feet) capacity, 235 metres (770 ft.) long, and 30.5 metres (100 ft.) diameter, fitted with six Maybach engines each of 400 h.p. The cost of the ship is said to be 2,600,000 marks (£130,000).

"LZ 127" is intended for the long-discussed Spanish-South

American service, for which both the Spanish and Argentine Governments have agreed to contribute a subvention in respect of mails carried. This ship is to be fitted both for passenger and mail work, and, subject to her passing satisfactory tests in service, will be followed by other ships probably even larger in size.

When the *Mayfly* was under construction I received more than one letter from the Controller of the Navy, saying high authority at the Admiralty did not believe in airships.

This was most disheartening to an officer who was carrying out the duty assigned to him in trying to develop airships. Similarly, the present airship officers, being human, must view with dismay these constant attacks on airships that two successive Governments have decided to experiment with. It is most unfair for an officer in one branch of the fighting services to lay himself out, as the inspirer of "Neon" has done, to attack the creative work that officers in another branch have, in pursuance of their duty, been detailed to carry out.

I do submit to the present First Sea Lord, Admiral Sir Charles Madden, who is a torpedoist, and likely to appreciate scientific investigation and work, that actions of this nature are not good cricket, and should be discouraged in the interests of all Services. There are great air problems waiting to be solved. All able officers of the State should, in my judgment, whether they belong to the Navy, Army, or Air Force, try and help the airmen by creative suggestions. Any person can make destructive, crabbing, carping criticism, but it leads to nowhere, and is not helpful in the solution of these very difficult air problems.

The whole Empire is looking to the Mother Country to develop speedier communication and to link up the far-flung portions of our domain. This was one of the most outstanding features at the last Imperial Conference.

The potentialities of airships have as yet not fully been tried out. In war operations, in the narrow waters of the North Sea, there is sufficient evidence to show that the German Zeppelins were of great value in fine weather in searching for

minefields and as sea scouts. If successful, these large airships may eventually help our cruisers in protection of trade routes and also be able to link up certain parts of our Empire better than any other type of aircraft. But their value in this connection has yet to be proved and it is believed they will, if developed, possess considerable commercial value for transport of passengers and light goods.

I submit that all right-thinking men and women in our country should stand by their airmen in their endeavour to build 5,000,000 cubic feet hydrogen gas capacity airships and handle them successfully in the air. This is a big experiment and worthy of big-brained men. The responsibility on the shoulders of the designers, builders and crew of the State airship "R 101" and the Burney airship "R 100" is great.

May I plead to my countrymen and women, and our good friends the Press, as one who has had enough bricks thrown at him in his time in trying to solve some air problems to pave Whitehall, as these pages partly show, to cease criticism of these two monster rigid airships. It is a difficult experiment, and those courageously carrying out this responsible work for the Government need all the support and help that can be given them in their really tremendous task.

I feel confident that the very able airship experts of the Air Ministry and Commander Burney, M.P., with his capable airship designers and constructors, will back me up in this appeal, and also denounce "Neon's" book as being rather unfair to all those employed in this large rigid airship work, as, after all, they are only carrying out their duty as good servants of the State.

CHAPTER V

ACCIDENTS TO AIRCRAFT. CAN THEY BE REDUCED?

EVERY airman, I feel confident, welcomed the Prime Minister's statement on air accidents in the House of Commons on 10th May,¹ and were grateful that he had made a personal investigation, even giving up many days of his hard-earned holidays to go into the matter thoroughly, by looking into the results of courts of inquiries, the accident reports, copies of the technical discussions, criticisms of all kinds covering every relevant point, statistics, comparisons of machines, analyses of all causes, even of engine failure when no accident had followed.

This was indeed a searching investigation. Mr. Baldwin paid visits to aerodromes and had many personal discussions with the officers of the Air Force of all ranks.

In the course of his speech, the Prime Minister stated—

Here I would say a word about the difference between training for civil aviation and training for military aviation. Every word that my hon. and gallant friend said is true about the civil aviator starting from a fixed point and flying to a fixed point, with intimate knowledge of every yard of the course and the necessity of maintaining the rule of "safety first." A man who has to fight has to be trained to get off any ground, to come down on any ground, and to be always flying over fresh country. His work in war is always over fresh country, and also, as was put by my right hon. friend opposite, who was Secretary of State for Air, he has to be up to every form of manoeuvring and stunt in the air. Stunts are not made in the air because they are stunts. They are made because they are often the only way in which the pilot can escape from the enemy when he meets hostile aircraft, and very often the only way in which ultimately he may hope to dominate the enemy. That is the work for which the man has been trained, and in the course of that he has to undergo a training of such a character that risks in it are unavoidable, even when the utmost amount of care is taken.

There is another thing which I saw at the aerodrome when I went,

¹ 1927.

The pilots in this Service do not only go off the ground singly ; they have to go off in groups. They have to go off as many as a dozen together, wing-tip to wing-tip, a proceeding which has in it elements of danger unless the utmost care is shown and the utmost proficiency has been secured. That is necessary, because in going up to fight hostile aircraft it is essential that numbers of machines should be together and keep together from the start. Those conditions cannot apply to civil aviation ; they do apply and must apply to the Air Force. There are no signs, so far as I have been able to discover—I have examined a great many officers on this subject—there are no signs, and I say that deliberately, of inefficient training in the Air Force. I think that the training, judging by the results, could not be better, and I think that the spirit of the Air Force is one of the marvels of our time. There is no finer spirit in any service in the world than there is in our Air Force.

There is one general criticism which has often been made and for which I think there is some justification. I spoke a few minutes ago about the efforts at economy which have been made in all the Services, and I think tribute has been paid to the Secretary of State from all parts of the House, even on the other side. If you admit there must be an Air Force, no one would deny that the Air Force is managed economically. But, it has been asked, has the staff of the flying units been reduced to somewhere near danger point ; has it been cut down too far ? I think it has. But let me immediately put this in : It has not affected accidents, and for this reason. If the ground staff be so slightly below numbers that it is impossible to give the supervision to all the machines that is required before they go up in the air, what happens is that flying is curtailed. It does not mean that any machine goes up in the air before it has passed all its necessary tests and has been thoroughly overhauled.

The amount of flying that is done naturally is increasing. That makes a greater demand on the ground men and on the officers with whom rests the supervision of that work. If the amount of flying which ought to be done is to be done, and to be done under the only circumstances that will be tolerable to the Force or to the country or this House, then I think that is a question that wants some looking into, and I am glad to think that my right hon. friend has been devoting time to it, and I believe that he will be making arrangements soon, if he has not already done it, for allotting a few extra men to these units. Then I think that that difficulty will be a thing of the past. But I do want to impress on the House that although that is a difficulty which has arisen, it is not one which affects the safety of lives, because the only result is to curtail the amount of

flying. It does not mean that unfit machines are allowed to go up.

I think that critics—I am saying this for the third time—do fail to realize the number of men that there ought to be on the ground in the Air Force. If anyone who has any doubts about it will go down to an aerodrome and just have a quiet look over a machine and the inside of it, and examine the machinery of it, then see the overhauling which is given to it, and see on what slender threads a man's life depends, I think he will realize the importance of the ground staff, and that wherever in the Government service money may be wasted, it is not wasted there.

This last paragraph is a good answer to "Neon," for "Neon" states that during the War, for each of the 22,171 aeroplanes "in charge in October, 1918, 84 men were retained on the ground."

But, reader, what are we to think of the author of a book who figures that the number in the Air Force at the end of the War was 1,862,364, whereas it was under 300,000? Could extravagance go farther? "Neon" has this time most certainly overpainted the personnel picture with a vengeance.

The Prime Minister's statement on accidents could not have been beaten. It was well thought out. But, in my judgment, some further action was necessary. On most political subjects the Prime Minister has the advantage over me. But, being in the last handful of pioneer airmen alive in this country to-day, he will forgive me, I know, if I claim to have earned the right to criticize air accidents. These deplorable losses of our gallant pilots are felt by those of us who have been connected with air development most keenly.

In the early days of flying we had fewer accidents in the naval wing than they had in the military wing, and I think we did a little more flying.

I attribute this to the skilled engineer artificers the Admiralty gave us. These men were used to parting locomotive Whitehead torpedoes, all intricate gunnery mechanism, and were engineers of considerable skill.

In the report of the Aeronautical Research Committee,¹ I find the following—

The Committee call attention to the need of officers with more technical knowledge, and to the hope expressed in their last report that it will not be impossible to provide for highly-skilled persons to make a direct technical diagnosis of each power-plant failure immediately it occurs, and to report it in a manner which will enable the Ministry to take measures to prevent recurrence. They consider it desirable to utilize to the full the knowledge of such officers as possess the necessary technical qualifications.

Now, Sir Richard Glazebrook, Sir Joseph Petavel, and Colonel O'Gorman are scientists I have worked with on Lord Rayleigh's first Advisory Committee on Aeronautics. They are men of considerable aeronautical attainments. Their advice to the airmen on technical matters in the Advisory Committee papers has always been of a high order.

Many times I have differed from Colonel O'Gorman over some of his Farnborough productions, but nobody can doubt his great ability as an aeronautical engineer and close student of the science of aeronautics.

These talented men could not have pointed out the need for more technical officers without good cause.

As can be seen in the speeches on air estimates, I have pressed for this very many times during the last few years in the House of Commons, and I submit to the Prime Minister, in these pages, that I think he would be wise, whatever the expense may be, to encourage the Air Minister to provide a trained aeronautical engineer to be in charge of each squadron with its reserve of aeroplanes. I shall be told that engine troubles in these days are few. My reply is that engine troubles and accidents due to causes not yet determined do occur.

On the 17th January, 1928, a most unfortunate accident occurred to a gallant pilot, Guy Stevenson, when flying near Tidworth. At the inquest on this pilot officer, it was stated that as the machine was finishing a loop about 600 ft. up, the

¹ *Report of Aeronautical Research Committee for the Year 1924-5, page 15.*

first strut from the body to the left-hand under-wing flew out. The left-hand wing collapsed and fell, and though the pilot made a great effort to keep the machine on an even keel, it fell to the ground.

I have always been against low altitude looping. If anything unforeseen occurs, enormous strain may have to be put upon the machine. Stunts for ordinary pilots of no great experience should be forbidden at altitudes of under 1,500 ft.

Flight-Lieutenant Pearce said he had flown Stevenson's machine for 20 minutes earlier in the day, and everything was in perfect order. It had also been examined before the flight.

I do not desire to make any reflection on this inspection, but for a responsible aeronautical engineer to run round all machines before they are allowed in the air is, in my judgment, a wise precaution that should be taken. Pilots' lives are far too valuable to run the risk of a machine failing in the air, if it is humanly possible to prevent it. I submit this view to the Prime Minister.

I am fully aware of the arguments that are put up against establishing a separate engineering branch in the Royal Air Force. They can be briefly summarized, as—

1. That the officers who are trained as aeronautical engineers, and become responsible for the technical efficiency of all aircraft, would become separated from the flying officers.
2. That the flying officers would take less interest in the technical side.
3. That difficulties with regard to promotion might arise.

There is much to be said for these opinions, and if these arguments can be sustained my contention that specialist aeronautical engineers are necessary in the Air Service falls to the ground.

Take 1. All the officers in the Air Service have one goal, which is "Efficiency." The aeronautical engineer, by his higher training, would be responsible for flying efficiency of all aircraft. He would be consulted by the flying officer when difficulties arose, and would become a very intimate friend of

all the pilots. He would exercise a wise supervision over the mechanics, and the flying officer would be grateful for this extra supervision, as it would be in his own interest.

In dealing with argument 2, a good analogy is that of a lieutenant in a battleship who is in charge of a turret. He is none the less keen because there is a specialist gunnery lieutenant in the ship, to whom he can appeal when anything goes wrong, and in my opinion the presence of a highly-trained gunnery expert makes him more desirous of mastering his job. Every flying officer knows he may be liable, through engine trouble, to have to make a forced landing in some inaccessible spot, and his life, with others, may depend on his technical knowledge. I do not think there is very much in the argument that the flying officer's technical knowledge would deteriorate if there were aeronautical engineers in his Service.

The other point raised in 3 is : Would the specialist aeronautical engineer take inferior status, or rise to the higher ranks ? This is easily answered. The authorities would see that the aeronautical engineer kept up his flying in exactly the same way as gunnery and torpedo specialists in the Navy keep up their general naval knowledge, and are eligible to rise to the highest ranks in the Navy. The highest ranks in the Air Service, under a wise administration, would be open to the specialist aeronautical engineer as much as to any flying officer.

After balancing all the pros and cons, I think the balance would come out in favour of specialist aeronautical engineers being established, and if this question was properly handled, this body need not necessarily grow into being a watertight compartment.

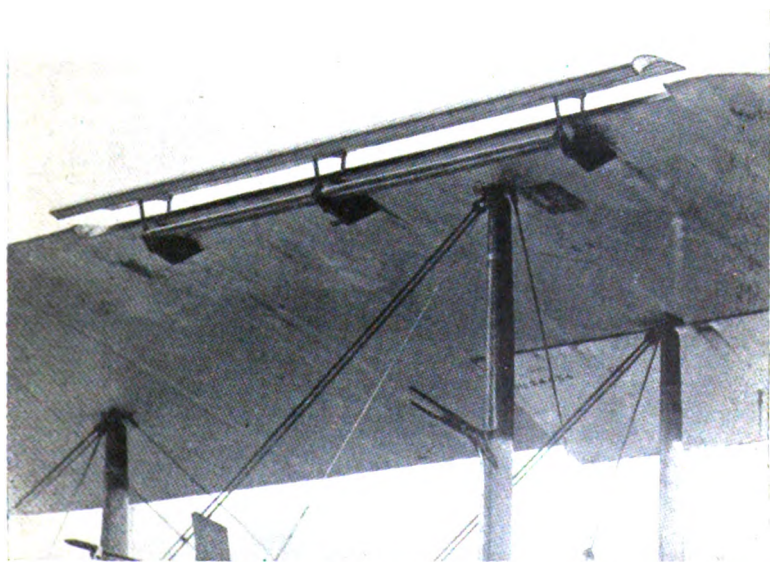
I freely admit that this question of trained aeronautical engineers is arguable, and, being a torpedo specialist, I may be biased in favour of engineer experts for the Air Service.

Another point I should like to submit to the Prime Minister is this : Why not set up an Accident Research Commission, and place at the head of it an ex-Air Minister like the very

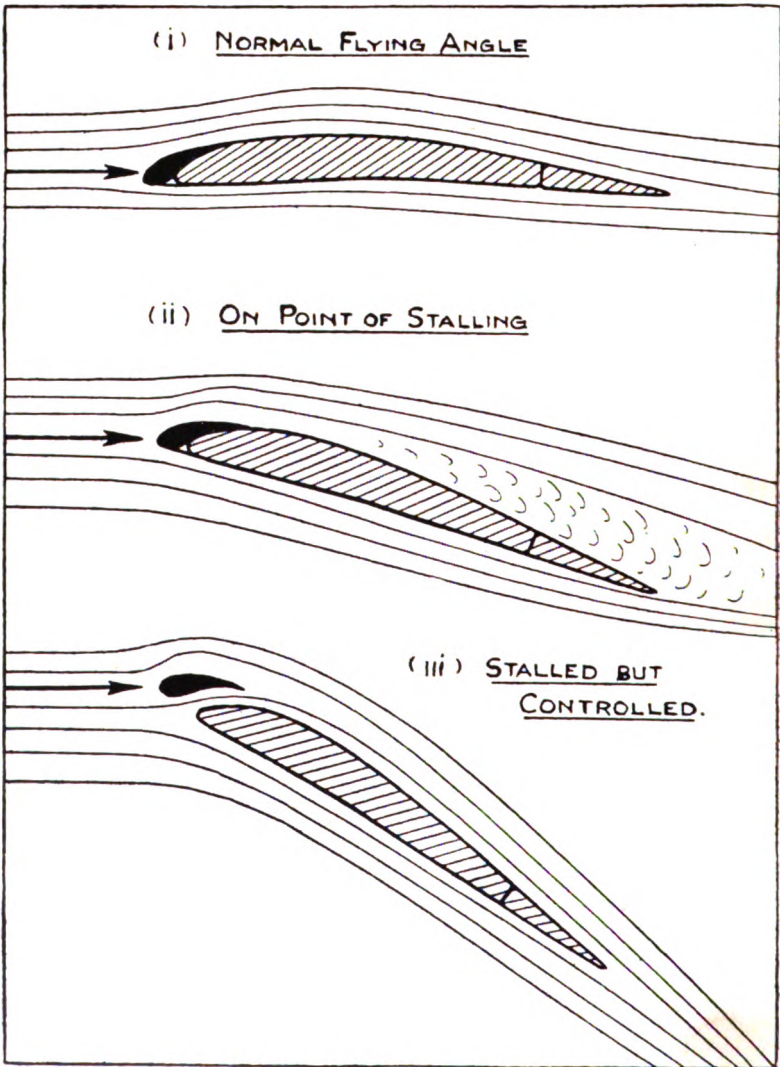


A NEW SAFETY DEVICE FOR AEROPLANES RECENTLY DEMONSTRATED
SUCCESSFULLY WITH THE SECRETARY FOR AIR (SIR SAMUEL HOARE)
AS PASSENGER

A machine fitted with Handley-Page wing slots



AN AEROPLANE WING FITTED WITH THE NEW HANDLEY-PAGE
AUTOMATIC SLOTS



A DIAGRAMMATIC IDEA OF THE OPERATION OF THE
HANDLEY-PAGE AUTOMATIC SLOT

capable engineer, Lord Weir? This Commission to be instructed to investigate accidents in all countries, and see how different nations tackle their accident problems. Some of the best brains Britain possesses should be made members of this Commission. They should be given a free hand and work directly under the Air Minister.

Nobody wishes to criticize in any way the able Inspector of Accidents, but a Commission with six or seven good brains studying this problem with all their faculties, from every possible angle, must be better than a single brain, however capable.

If the Prime Minister had carried his remarks by this one constructive step farther, and set up an Air Accident Research Commission, then—with more and more skilled aeronautical engineers to nurse the machines on service and in the reserves, with careful watching and guidance of the young airmen by their more experienced commanding officers and senior flying officers attached to the air stations—I think, humanly speaking, nothing more can be done, except to provide the very latest machines that modern air science can produce.

Many of us were relieved and much gratified when the Air Minister stated in the House of Commons that he had decided to eliminate all the old War types of aircraft.

After many years' patient research, Mr. Handley-Page, the pioneer of the large bombing machine first ordered for the Royal Naval Air Service, has produced his slotted wing device, which is reported to cure that fatal peril of the air, the uncontrolled spin which follows a loss of flying speed.

If this invention can be applied to the machines used by inexperienced pilots, a large number of accidents, particularly when making a forced landing in an unknown place, may be prevented (Plates 35 and 36).

In his able lecture on "Safety Devices," on 20th October,¹ Mr. Bramson quoted French statistics to show that of 100 accidents, 54 were due to errors of judgment and 22 to engine

¹ 1927.

failure. A fatal accident following an engine failure is almost invariably due to the pilot's inability to make a safe landing, which in itself, though it may be hard luck, amounts practically to the same thing as an error of judgment. In other words, 76 per cent of accidents are due to an inability to land safely when something happens.

One would not be far out if one said that out of those 76 fatally bad landings 60 at least are fatal because in an effort to land, or in an effort to get off the land, the pilot stalls his machine, and either nose-dives straight, or spins and nose-dives, into the ground.

For the benefit of the uninitiated, it is claimed that with Handley-Page slot (plus aileron) control, even the worst pilot cannot spin and nose-dive if he stalls his machine. It is said proper control, which can be secured by this device, means abolishing practically all fatal accidents due to stalling through trying to get off, stalling in landing, stalling through trying to get to a safe landing ground, and stalling when turning to get back to the aerodrome with a failing engine. In fact, short of sheer bad steering and pushing a machine straight into a building or into a wall, no pilot ought to be able to damage himself or anybody else in a stalled machine in future.

The automatic slot is fixed to the leading edge of the aeroplane, immediately in front and extending to the length of the ailerons. Where, however, the ailerons run the entire length of the plane, or are of exceptional length, the length of the auto-slot can be taken to be one-sixth of the span of the aircraft.

There are various mechanisms by which the auto-slot can be made to operate. Two of these are—

1. The hinge type of slot, whereby lateral action takes place, or

2. The fore and aft pivot type.

The pivots or hinge points are designed to provide a parallel movement, and are so positioned to keep the auxiliary aerofoil closed until such time as it is deemed necessary that the slot should open.

For example, with an aircraft having a stalling speed of 40 miles per hour, with a top speed of 110 miles per hour, and whose climbing speed off the ground is 70 miles per hour, it is obvious that the slots are not required to open until a speed of 50 miles per hour has been attained. If, however, lateral stability is required above this speed, it is a simple matter to make the slot open earlier.

As its name implies, the auto-slot is entirely automatic, in that when the aircraft is flying level the air pressure is concentrated on the nose of the auxiliary aerofoil, thereby keeping it closed. When the angle of incidence is increased, the resultant pressure moves farther back, causing a suction which automatically opens the slot. The operation of the slot is gradual but positive.

Criticism has been directed towards the possibility of one slot either remaining fully open and failing to close, or vice versa. It is pointed out that whilst the slot for various reasons, possibly seizure, may appear to an individual to be extremely difficult to operate, it has not been found in practice that such is the case in the air. Furthermore, should the slot mechanism fail, permitting one slot to remain fully open whilst the other is closed, it does not follow that an accident will be caused, because at normal speeds the lateral control of the aircraft is sufficient to counter such an unlikely eventuality.

There is less reason for the failure to occur in the operation or mechanism of the automatic slot than the few failures that are recorded against elevator and rudder hinges on an aircraft.

The slot does not affect ordinary acrobatic or fighting manoeuvres. Whilst there is a diverse opinion that spinning is a fighting manoeuvre, this erroneous impression is quickly dispelled when you read accounts of famous war pilots of experience ; all of them emphatically state that they gain most of their victories by pilots attempting to break off an engagement by spinning down. This point is emphasized because with the auto-slots a machine is difficult to spin. It is not claimed, however, that a spin is impossible.

Mr. Handley-Page's claims that the incipient spin has been prevented have been fully substantiated by the numerous pilots who have flown automatically-slotted machines. An intentional spin is possible, providing the pilot knows the method of executing such a manoeuvre with a machine fitted with automatic slots.

In high altitude flying, difficulties with slots may arise, but no doubt some form of light mechanism may be developed for controlling the slots at high altitudes, and for taking off with a heavy load.

The fitting of the slots is of a simple nature, the additional weight being only some 15 lb. in the case of a two-seater light bombing aircraft.

From Washington we learn that the Navy Department has announced that all Army and Navy aeroplanes will be equipped with the Handley-Page automatic-slot device to prevent nose dives and tail spins. The Government has obtained the rights for this from a British concern.

Also in this country the Air Ministry in July last decided to fit the automatic slot device to certain of their machines, and the Air Minister (Sir Samuel Hoare) has since then tested a machine so fitted in the air. The device has also been tested by the Imperial Airways, with a view to it being used in their liners.

An automatic device of this nature fitted to all machines is well worth the consideration of the Authorities, and I hope and trust Handley-Page's device will do all that is being claimed for it. If it does, this able constructor will receive the thanks of a great many of his countrymen.

Fortunately, I have to record that the casualties in the Air Service in 1927, up to 5th December, was 48, as compared with 85 in the previous year.

I disagree entirely with what a colleague of mine said in the House of Commons, that some of the flying accidents might be due to too much consumption of alcohol by the pilots.

Of all the hundreds of pilots that went through my hands in the Naval Air Service, I can recall no case of any airmen being

court-martialled for taking an excessive amount of intoxicating liquor. This is a fine record, and any person who tries to insinuate that our airmen are not an extremely abstemious body of men is doing a disservice to all airmen.

Thrills at aerodromes do not appeal to me, and I think the Committee of the Aero Club would be wise to bring about more stringent rules for the air competitions, to prevent these most regrettable accidents through collision in the air occurring, and also to prevent dangerous stunting at low altitudes. Spectacular take-off stunts should never be allowed, as there is always the danger of engine failure in a fast vertical climb when reaching the top of the climb. In this case the machine has little or no air speed. If the engine stops, the laws of gravity come into play, and the machine has the full force of gravitation acting upon it, gets out of control, and a crash ensues.

Many people in this country will not understand that air work is different to ground work. If a mishap occurs to a train or motor-car, disaster need not necessarily take place. The same on the sea ; mishaps to ships need not be disasters. But nothing less than sky hooks will be necessary if all air accidents are to be entirely eliminated. This cannot be done with aircraft any more than it can be done with motor-car accidents. But I do feel convinced that with a big effort more might be achieved to reduce air accidents to a minimum.

LONDON'S DEFENDERS ¹

Up above the town so high,
Like silver minnows in the sky,
The great planes drone upon their way.
Thank goodness it is only play !
And from the vault no bombs are shed
Like rain on my devoted head.
I well recall that Saturday
When there was quite the deuce to pay,
And I beheld a horrid crew—
Five Gothas sailing in the blue.
The guns popped off, but never hit ;
The Gothas didn't mind a bit,
But still pursued their way serene,
For not an English plane was seen,
Because our fighters in the air
Were fully occupied elsewhere.
And now that it is quite intended
That London shall be well defended,
I have no use for those who frown
And bid us cut our Air Force down,
To set the world a good example.
I'd rather have a force that's ample.
All sane men pray that wars may cease ;
But the best guarantee of peace
Is to be sure of hitting back.
That's what discourages attack.

TOUCHSTONE.

¹ *Morning Post*, 26th July, 1927.

CHAPTER VI

THE CREATION OF THE FIRST ANTI-AIRCRAFT CORPS FOR THE DEFENCE OF LONDON

EARLY in September, 1914, the First Lord of the Admiralty sent for me, and said "D.A.D.,¹ Mr. Montagu at the Treasury is rather perturbed, as he went to visit the gun over the Foreign Office last night and found all the crew asleep! Do you know how many guns have been provided for the defence of the London area against Zeppelins?"

I replied: "They have one 1 Pr. pom-pom on Admiralty Arch; one 1 Pr. pom-pom on the Foreign Office; one 1 Pr. pom-pom on the Crown Agents' Office. That is all we know anything about in the Air Department."

Mr. Churchill then said: "Well, something must be done. We cannot have Zeppelins sitting over Whitehall dropping bombs. It is a War Office responsibility, I know. But they have all their work cut out to keep the Army going in France. They are strained to the utmost, and I am quite certain they can give this matter no attention, nor can they spare the men. We must take this on as a temporary measure, D.A.D. You know all about Zeppelins, so I think you had better run this defence. The matter is most urgent. I will appoint a small committee, the Third Sea Lord (Admiral Tudor-Tudor), the Director of Naval Ordnance (Admiral Morgan Singer) and yourself, to draw up some preliminary orders, and I will ask the War Office to send over a representative from the M.G.O.'s² office or Defence Department to let us know the exact position."

Mr. Churchill then obtained Cabinet approval for the Naval Air Service to take the necessary steps for the defence of London and other important places in the country against aerial attack. This was to be regarded as a temporary measure

¹ Director of Air Department.

² Master-General of the Ordnance.

until such time as the War Office could resume their responsibility.

After the interview with Mr. Churchill, I sent for two of my very able assistants, Commander Groves, R.N., and Commander Halahan, R.N., and informed them the First Lord had given us another nut to crack, and this time it was one of some magnitude.

The Third Sea Lord held a few conferences. Admiral Morgan Singer explained that all the guns and searchlights of any value were required for the Grand Fleet ; but he would overhaul his reserves, and no doubt could spare us a few guns and searchlights. The War Office representatives said the three guns already mounted represented all they could do at that time.

The problem for me to solve was how could we erect and man the gun and searchlight stations when the D.N.O. was able to let us have them from his reserves. The Army was unable to spare a single man, neither could the Navy or the Air Service. After taking counsel with my two Commanders, we came to the conclusion that we would have to raise an entirely separate anti-aircraft corps, and in this undertaking I was fortunate in being able to secure the services of Captain Stansfield, R.N., a most capable officer, and with his good help we started immediately to enlist officers and men to form the Anti-aircraft Corps for Defence of London. Some were taken on for whole time and others for part-time work.

Sir Edward Ward assisted us in a really splendid way. Also Sir Edward Henry gave us at once 120 of the Special Constabulary. I also secured the services of Lieutenant-Colonel Greville Grey. We made him a Commander, R.N.V.R., and no man could have done better in helping to create this corps. They were enlisted as R.N.V.R.'s and drawn from all stations of life. We secured the services of barristers, lawyers, stock-brokers, insurance experts, bank managers, masters of industry and their clerks—all splendid men, a little on the elderly side, but full out to work all day in keeping the business of the

country going, and then all night alongside a gun, searchlight, or in a control position, as required. I managed to secure a few pensioned naval chief petty officers, former captains of guns, and some torpedo instructors, to leaven up our new Corps. All our men were well educated, and they soon learnt the rudiments of searchlight operations, gun-laying, control work, and, in a short time, compared favourably with a seaman's gun or searchlight crew.

On the 4th September, 1914, I got out for Mr. Churchill a Memorandum on the Defence of London, treating the portion of London extending from Buckingham Palace to Charing Cross Bridge, as being the most vital portion, and arranged for a scheme of defence with this as a centre. Captain Altham, R.N., criticized this scheme for me from the gunnery point of view, and made some very valuable suggestions. Under my scheme, I allowed for the protection of important positions such as the Bank of England, General Post Office, Chelsea Power Station, and the principal railway stations, by concentric rings of searchlights and guns at a specified distance from the vital area, with additional guns and searchlights within the area as required. Outside this, I arranged for a certain number of defence aeroplane squadrons, with emergency landing grounds in the Park. Fortunately, I had been a torpedo officer in my younger days, and had the running of a battleship's searchlights as part of my duty, under a celebrated torpedoist, the late Admiral Sir John Durnford, who was also my Captain in the Torpedo School *Vernon*. In the Mediterranean Admiral Lord Charles Beresford used my small cruiser, the *Barham*, in fleet searchlight exercises for night firing, etc. Consequently this experience enabled me to go into full details with Mr. Churchill in regard to the relative positions of searchlight to gun, control and observation posts, etc. He minuted my memorandum on the 5th September, 1914. "Admirable, but beyond our resources." However, my memorandum was taken as a guide for the anti-aircraft defence of London and Portsmouth by order of the First Lord. Our chief difficulty was

that we had no high explosive shell in the early days of the War, but this was remedied at a later date.

By the second week in October, 1914, I was able to report to Mr. Churchill that we had twenty gun and searchlight positions completed or just completing, with five more positions selected and some more started. Others were in view. Also we had the nucleus of an anti-aircraft corps properly formed for expanding as required. Without the good aid of the Works Department, London County Council, and Scotland Yard, we could not have progressed with such rapidity. Orders were promulgated for controlling the lighting of London, and I sent Wing-Commander Maitland across London in the airship *Beta*, commanded by a very able airman, Flight-Lieutenant K. J. Locke, to inspect and report on the restricted lighting arrangements, also Commander Groves was sent over in a free balloon for the same purpose. Other balloons were sent over from time to time, and I also sent Squadron-Commander Neville Osborne, the gallant Commander of No. 3 Airship, to inspect the lighting of the Strand, Regent Street, Oxford Street, and Trafalgar Square from the air.

The officials of the Office of Works could not have been more helpful. Whatever the Air Department suggested they carried out, and entered wholeheartedly into the work of mounting lights and guns with the necessary accommodation for officers and men working them.

These officials were full of zeal and extraordinary resource in all this creative work. The speed with which they mounted searchlights and ran cables on places like Lambeth Bridge, Hyde Park Corner, roof of Charing Cross Station, etc., guns on Embankment, Tower Bridge, etc., and connecting these stations with the control positions to the Air Department's requirements, would have led one to suppose that these civilians had been trained to mount guns, searchlights, and control positions all their lives, instead of being just introduced to these requirements of modern warfare. At first we had some difficulty in impressing upon everybody that darkness is the best defence

against aerial attack. But large black spaces are to be avoided, as they are a guide to hostile aircraft and have to be supplied with a few lights to get a uniform dulled lighting system throughout, with no building clearly defined.

Our sea-going experience was of great value in working out group systems, fixing the control positions in relation to the guns and searchlights, and naturally all searchlights have to be mounted in a position where, if hit, no great damage is done to a place of vital importance. The searchlight position is always an object for attack with a few bombs.

This air defence of London was a big nut for the Air Department to crack, and not at all an easy problem. Captain Altham, of the D.N.O.'s Department, gave us most helpful advice in this new work and the success we obtained in forming and developing the Anti-aircraft Corps owes much to him. Nobody could have worked harder than my two fine Commanders, Groves and Halahan, and our very sound Captain Stansfield. I do not know what we would have done without his valuable services as "Inspecting Captain" in getting a little discipline into our newly-created Anti-aircraft Corps. We used him for all sorts of jobs.

I never think of Captain Stansfield without laughing, and if ever he sees these pages he will remember the following incident : One day I was working with Captain Stansfield in my Admiralty office, trying to solve some of the many problems that always arise when creative work is being done, when I was called up on the telephone to receive the usual message, "The —— Sea Lord desires to see you at once."

By Mr. Churchill's directions, I had at this time to nurse triplets, the Naval Air Service, the Armoured Car Force, and the Anti-aircraft Corps for the Defence of London. Just about enough for one man to control ! As I went over to the Sea Lord's room, I wondered which "Baby" this time had fallen into the soup. "Air Baby," as usual, I surmised. On entering the room I was greeted with this : "I hear, D.A.D., that the Air Service pilots go to 'The Goat.' " "I beg your pardon,

Sir, but what is 'The Goat'?" "It is a disreputable pothouse, where your men loaf, smoke and drink." "Very good, Sir, I will look into it and report what I find."

When I returned, Captain Stansfield was still in my room, and, if my memory serves me right, I asked him to accompany me to inspect "The Goat." We found this establishment half-way up Regent Street, on the left-hand side from Piccadilly Circus. It had a bar, a billiard table, and was quite a decent rest-house for those officers who had not the money or inclination to join the many more expensive clubs in which the Noahs always appropriate the best papers, the best arm-chairs, and always forget to thank a junior officer when he politely holds a door open for them to pass. I have seen a Commander very wrathful at his act of civility being ignored by a Noah of high degree in a well-known London club. When on leave, some of the junior officers of the regular services and R.N.V.R. felt more at home in "The Goat," and they had to have some place to go to in London. I reported what we found in our visit to "The Goat." But this did not satisfy the Sea Lord, who had nothing in view but to find fault with myself and the Naval Air Service.

He had no ability to criticize anything technical with regard to our air work, and it always descended into the so stupid piffling criticisms that made the whole Air Department laugh heartily, and which was really bad for discipline, as inclining to throw high authority into contempt. The Assistant Provost Marshal, or some such person, was called in to consult the Sea Lord, and after some conversations, with much secrecy, it was decided that one night "The Goat" should be raided. The raid was duly carried out. The bag consisted of one or two regular naval officers on leave from Chatham, a few R.N.V.R. officers, and, if I recollect rightly, a marine. But not a single naval airman! How we laughed at this great "bag" which was so worthy of the organizer!

That was the last I heard of "The Goat" officially. But I believe this club continued to exist throughout the War as a

most useful and respectable rendezvous for a large number of junior officers when on leave in London. I have served afloat in many ships in many parts of the world from the time I was 15½ years of age. My duty has brought me into contact, when introducing the submarines into the Navy, with great firms like Messrs. Vickers, also in air work I have come into intimate contact with the whole of the air industry, and have been for over six years a Member of Parliament, and I have no hesitation in saying the naval airmen were as sober as any men in the King's Services, or any body of men in the country.

I do not believe any force, with gun, searchlight, and control positions, has ever been raised with such rapidity as the Anti-aircraft Corps for the Defence of London. It was far from perfect, because we could not get the latest high-angled anti-aircraft guns and up-to-date searchlights. We had to do the best we could with what was spared by the Director of Naval Ordnance. At a later stage more efficient anti-aircraft guns and high-explosive shells became available to replace the older types.

In the creation of this force the Chief Commissioner of Police, Sir Edward Henry; Major Haggett, Bailiff of the Royal Parks; Mr. Frank Baines, Principal Architect of H.M. Office of Works; Mr. Hubert Baines, Deputy Chief Engineer H.M. Office of Works; Mr. Boulton, Engineering Inspector of the G.P.O.; Mr. H. M. Hetherington, District Engineer, H.M. Office of Works; and Mr. Long, District Inspector H.M. Office of Works, laid themselves out to give every possible assistance to Commanders Groves, Halahan, and myself. We were very grateful for their good help, and I fear we worried them much. But they have the satisfaction of knowing they played no small part in helping to overcome the Zeppelin menace.

The Germans were getting furious at the delays that were occurring in the long-promised aerial bombardment of London, and were clamouring that this should be done. The first air raid by a Zeppelin on London was made on the night of 31st May, 1915, when about 100 small explosive and incendiary bombs were dropped in the East and North-East districts of

London ; no great damage was done, but unfortunately five people were killed and some 14 were injured. The German people quite thought a Zeppelin appearing over London and dropping bombs would cause a panic, and the city soon become a heap of smouldering ruins. But the steps we had taken by Mr. Churchill's foresight and orders, in creating a strong anti-aircraft corps, to prevent the German Zeppelins having it all their own way, appealed to Londoners, and they took these attacks philosophically. Most Londoners remained on the roofs of their houses, on balconies, and groups in the streets, to watch the anti-aircraft guns fire at the illuminated Zeppelins. From the top of the Admiralty Arch, my chief control position, the scene resembled a gigantic firework display. It was a fine spectacle.

On 7th and 8th September, there were more Zeppelin attacks on London, and the damage done the first night by the 35 bombs dropped in the Eastern district was not very great, but 16 people were killed and 30 were injured. The second night, some 50 bombs were dropped in the East End, north of the river, as far as Holborn, Bloomsbury, and killing 16 people and wounding 50 others ; much structural damage was done in this attack.

In the *Morning Post* of 13th October, 1927, a most interesting account is given by the captain of the German Zeppelin airship " L 15," by Kapitan-Leutnant (a.D) Breithaupt, on " How we Bombed London "—

Twelve years have passed since that first concerted airship attack over London, in which five Zeppelins—" L 11, 13, 14, 15, and 16 "—took part. I was Commandant of the " L 15," and thus after many wartime cruises had the opportunity for the first time to be engaged in a raid.

In the following story I shall give an account of what concerns my Zeppelin, based on the notes which I made immediately on our return.

London had always appeared to me the most profitable target for an air attack, and I had accordingly set down the course for such a flight. In the early morning of 13th October came the telephone order

for the flight for all available airships. The preparations were immediately begun. The crews, proud of their first opportunity to take part in a raid, carried the munitions and bombs on board; the petrol and water-ballast tanks and the gas bags were filled.

At one o'clock, Central European time, the "L 15" was in the air. On board were two officers, two warrant officers, and twelve ratings. The total weight-carrying capacity of the ship, including barometers, temperature and humidity measuring appliances, and also the specific weight of the gas (Traggases), was about 14,000 kilos. Of this weight the petrol (Betriebstoff) comprised about 5,000 kilos, and bombs 1,550 kilos (28 explosive bombs of 50 kilos each and 15 incendiary bombs of 10 kilos each).

We steered over the Friesian Islands, outside the three-mile limit, in order to avoid infringing Dutch neutrality. Thick fog lay over the sea. We rose, therefore, in order to avoid the so-called "Wash-house" (Wascheküche) and surmount the clouds. In the brightest sunshine the airships steered between the cloud masses at various altitudes. We closed with the two other airships which were coming from their aerodrome on the same errand as ourselves. The English opinion that the airships manoeuvred under the leadership of a commander-in-chief or senior officer in squadron formation is not correct. The order of the day was as follows: "Attack military and economic objects of importance in South England." Each commander acted within the limits of this general order as an independent unit. The choice of objective was always left to the pilot. Corvette-Captain Strasser avoided giving more than general directions. He knew, as an experienced pilot, how much the decision of the commander must be influenced by weather and local conditions. On this ground alone the ships did not fly in close formation.

At 7.30 p.m. we were between Cromer and Great Yarmouth at a height of 2,000 metres, a few miles off the coast. The visibility was good under a starlit sky. In the distance gleamed the white breakers, and beyond them the outline of the cliffs was clearly cut against the sky.

We took our bearings precisely, waited for full darkness, and then steered a direct course for our objective—London. As we crossed over the coast, we came under sharp fire from the batteries, and the ships were lit up by the searchlights of the coastguard and shore batteries.

As we flew over the land we guided ourselves from time to time by discharging light bombs. About 9.30 the Thames was well marked out below us with its characteristic windings. All water ballast was now thrown out in order to obtain the greatest possible height. All

hands took their stations for action. London lay darkly under us, only a few lights showing.

Suddenly, from all sides, searchlights leapt out towards us, and as we flew over Tottenham a wild cannonade from the anti-aircraft stations began. The shells burst at a good height right in our course. I therefore rose, after letting off three explosive bombs, and endeavoured to make an attack from another quarter. We circled round London by north and north-west.

At about 10 p.m. we were well westward of the sea of houses, which now, on account of the many searchlights, were clearly to be seen. We then steered over Hyde Park in the direction of the City. The picture we saw was indescribably beautiful—shrapnel bursting all round (though rather uncomfortably near us), our own bombs bursting, and the flashes from the anti-aircraft batteries below. On either hand the other airships, which, like us, were caught in the rays of the searchlights, were clearly recognizable.

And over us the starlit sky! Still, at such a moment, one is inclined to be a little insensitive to the beauties of Nature and to the feelings of the people below. It is only afterwards that all this comes to one's consciousness. At the moment it is necessary to concentrate one's attention. We flew over the City at between 2,800 and 3,000 metres altitude, and dropped twenty bombs of 50 kilos each, and all the incendiary bombs. Severe explosions were seen between Charing Cross Station and the Bank of England.

According to my observation, the shells exploded for the most part too high. From all sides blazed the flashes of the guns. We had only one thing to do. Carry on and trust in our star. What effect the bombs had at the places where flames were observed I cannot say; nevertheless I believe it was pretty warm in the City. I have learnt from English eye-witnesses that the attack of our airships made no small impression on the people.

Captain Joseph Morris writes of this attack in his interesting book, *The German Air Raids on Great Britain*, as follows—

"The casualties caused, if considered from the point of view of the total number of ships employed and of bombs expended, were more severe than in any other airship raid *before or after*. Breithaupt reserved most of his bombs until well over the centre of the City, and dropped them on Exeter Street, Wellington Street (between the Lyceum Theatre and the offices of the *Morning Post*), on Catherine Street, Aldwych, the Royal Courts of Justice, Carey Street, Lincoln's Inn, Chancery Lane, Holborn, Gray's Inn, Hatton Garden, and Farringdon Road. In all nineteen high explosive and eleven incendiary bombs fell from his ship on London."

This statement corresponds with my own observations.

Sixty minutes had simply flown by since we dropped the first bombs. We breathed more freely as about 10.45 we left the City behind us. Then suddenly as we were about over Leyton, from a direction in which we had not expected it, a new and murderous fire began. At the same time through the rays of the searchlights a shower of enemy aeroplanes flashed. They appeared on both sides, and were simultaneously signalled overhead by the look-out man on the top of the ship.

Morris¹ disputes the presence of aeroplanes in the air on this occasion, but I believe he is wrong. Star shells whizzed through the air, describing glowing white parabolas as perfect as any drawn on paper.

Over the coast, in the neighbourhood of Ipswich, we again suddenly came under fire, about 12.30. Searchlights played round us, but the last shell shot far away below us as a parting salutation, and we found ourselves over the sea, at 3,800 metres.

We announced the result of the attack by wireless telegraph to our chief, and steered for the Dutch coast. Fog again lay thick over the North Sea, and it was difficult to keep our course, in spite of wireless directions. Time pressed, since we had only enough petrol for a few hours more.

At last, at one o'clock in the afternoon of the following day, we made out the captive balloon, which was flying over the fog above our landing place as a guide to us. We came down through a sheet of cloud 300 metres thick, and landed safely, being warmly greeted by our commander and other comrades, who had landed earlier.

In commenting on this raid, the *Morning Post* says it is of special interest to them, because the first two bombs dropped outside its premises—one in Wellington Street and one in Exeter Street—and smashed a great deal of glass. They just failed to wreck the building, but the miss was as good as a mile in respect of the production of the paper,² and in their leading article that paper observes it is, perhaps, fortunate for us that so slender a defence was able to produce such a profound effect on the commanders of the German Zeppelins; and, looking back, it must seem strangely fortunate also that the immensely formidable armament of these air raiders produced

¹ Captain Morris is correct.

² *Morning Post*, 13th October, 1927.

no greater destruction. London is a very big target. It would be impossible to miss it ; and yet, of all the scores of bombs that fell upon it, not one struck a vital spot.

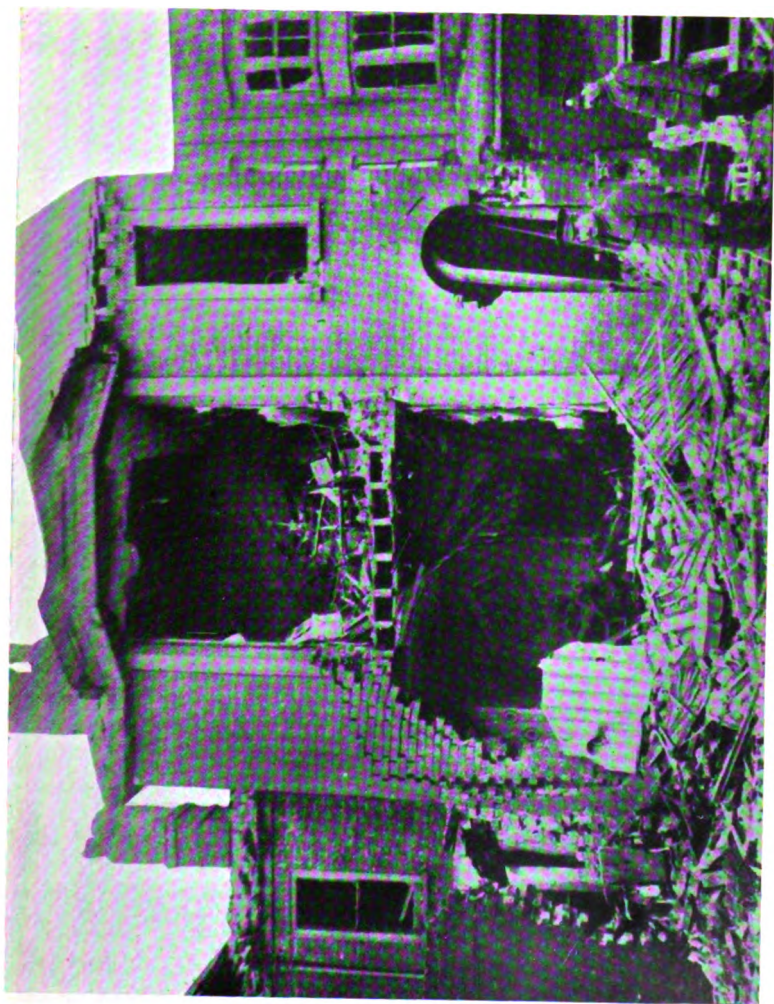
There is no doubt we bluffed the Germans with our hastily-formed Anti-aircraft Defence of London.

Captain Morris, in his most interesting book, *The German Air Raids on Great Britain*, gives full details of these operations from 1914 to 1918, which extended not only about the London area, but on the coast towns and in the north. As more German Zeppelins became available, the importance of further development of the Anti-aircraft Corps became apparent, and when Mr. Churchill left the Admiralty, I was glad that Mr. Balfour relieved me of night work by appointing Admiral Sir Percy Scott as Air Defence Commander in my place.

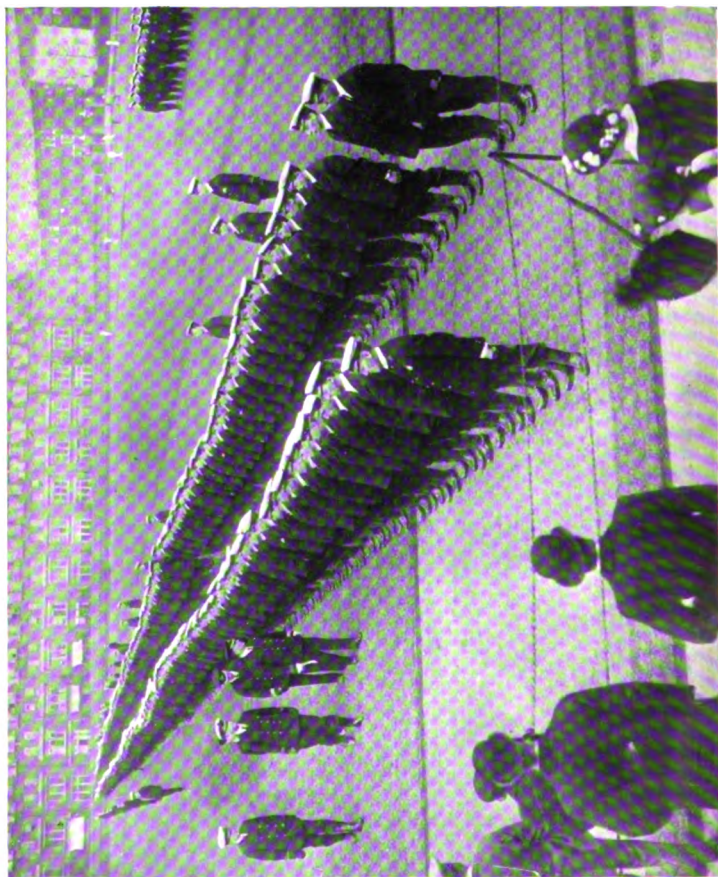
The gallant Admiral was quite pleased with what we had done with our small resources, and told me Mr. Balfour had instructed him to obtain more guns, and he was sending Colonel Rawlinson, a very able gunnery officer, who I had called in to advise me, to Paris, to see what he could rake up. He said he was not going to be bothered with the infernal Admiralty red tape, and I believe it is on record that Percy Scott, with Rawlinson's good help, had guns in London that they obtained from General Gallieni,¹ the famous defender of Paris, before the letter asking the French Government for their supply had left the Admiralty.

This sort of procedure took the breath away from some of the Noahs, but Percy Scott had summed up Admiralty administration many years before. I suppose no Admiral in our naval history had more fights over red tape piffle than he had. His struggles against cleaning paintwork and brasswork, so well beloved by Noahs, and replacing this with gunnery training and gunnery exercises, in firing shot at a target that was so detested by the Noahs because of the damage to their paintwork, is historic and too well-known for me to more than mention.

¹ Afterwards Marshal Gallieni, the real victor of the Marne.



A YARMOUTH HOUSE WRECKED BY A ZEPPELIN BOMB
(*Illustrated War News*), 27th January, 1915



THE AUTHOR INSPECTING THE ANTI-AIRCRAFT CORPS OF LONDON, WITH
COMMANDERS GREVILLE GREY AND HALAHAN, 1915

Lord Balfour always laughed at the Anti-aircraft Corps, and said I put the Admiralty Librarian, Lieutenant-Commander W. J. Perrin, in charge of a gun. This struck him as being priceless. My reply was, "Well, sir, he is one of our best officers, and I am certain his gun hit a Zeppelin the other night, and damaged one of her propellers."

There is no doubt that the German airships were hit far oftener than we supposed.¹ Captain Joseph Morris, in his book,² bears this opinion out, for he informs us that "When the airship ('L 6') was berthed in the shed, she was found to have two large and six smaller holes, from 2 to 10 centimetres in diameter, made by gunfire, and 17 machine-gun hits."

The Anti-aircraft Corps, under Commander Grey, was most efficient, its personnel extended from London to Dover, Sheffield, and helped at Chatham, Sheerness, etc., with mobile sections for work where required. Now what service did they carry out? Before we were able to develop night flying, Grey's men stuck to their guns and searchlights night after night, after keeping other important work going all day.

If it had not been for this Corps, the German Zeppelins could have sat over the General Post Office, Bank of England, administrative centres of Whitehall, Westminster buildings, Buckingham Palace, and blown them to pieces. In the early days the anti-aircraft guns alone prevented this from being done. (Plate 37.)

These guns forced the airships to remain at an altitude where, owing to the subdued lighting, no clear target of any building was visible. Bombs had to be dropped haphazard, consequently little damage was done and the people of London have to thank Commander Grey and his anti-aircraft men for that service. It always seemed to me that Commander Grey was very poorly rewarded for saving the important buildings and administrative centre of London in the early days of the War from much damage. (Plate 37a.)

¹ See p. 18.

² *The German Air Raids on Great Britain*, pages 22 and 23.

My anti-aircraft scheme was worked to, with certain modifications, right up to the end of the War, when no less than 370 searchlights, with their guns and control positions, were mounted in concentric rings for the defence of London against aerial attack, and Major-General Ashmore in 1917 organized squadrons of fighting aeroplanes allocated to zones to defend Southern England. These defences were broken up after the War, but since then a gradual process of resurrection has been taking place, and the anti-aircraft units of the Territorial Army have been raised to strengthen this defence, and certain squadrons of the Royal Air Force have been detailed for defence duties. This is only a nucleus, but the working together of ground and air forces is of great value.

The recent air manoeuvres¹ held by the Royal Air Force will no doubt show up the weaknesses in guns, searchlights, observation posts, defence aeroplanes, etc., and we may expect the result of these exercises to be fully explained in the House of Commons, with the view of making good any shortcomings. Also we may expect to learn that the attacking bombing aircraft did not have it all their own way, but the defence put up a good resistance. However, no defence, however skilfully arranged, can prevent some of the attacking aircraft from getting through and reaching the vicinity of their objective. The modern aeroplane is possessed of great range, great speed, is an exceedingly accurate weapon, and is not easily intercepted.

There is no question that poison gas as a weapon from the air will be used for certain in all future wars. My colleague in the House of Commons, the late Field-Marshal Sir Henry Wilson, wrote—

No convention, guarantee, or disarmament safeguard will prevent an unscrupulous enemy from employing poison gas, especially if that enemy has discovered some new powerful agent, or possesses, as Germany does in her well-organized and strong chemical industry, a ready means for producing such chemicals in bulk at practically a moment's notice.

¹ Autumn, 1927.

And General Groves draws our attention to the continental view, which is that aircraft offer the ideal method of employing gas on a great scale. For example, General von Altrock, the well-known German military author, writes in the *Militär Wochenblatt*—

In future wars the initial hostile attack will be directed against the great nerve and communication centres of the enemy's territory, against its large cities, factory centres, ammunition areas, water, gas, and light supplies; in fact, against every life artery of the country . . . Entire regions inhabited by peaceful populations will continually be threatened with extinction.

Should we have the misfortune to be involved in another European War, there is little doubt that London, with our other great cities, would be liable to violent attacks by incendiary, explosive, and poison-gas bombs, dropped from aircraft. Our naval and mercantile marine ports and large industrial centres would be exposed to similar attack. This is a real danger, and it would be prudent to make provision for administrative staffs to work underground to avoid dislocating the machine.

London is the " hub " of the Empire, and its protection needs the closest attention from our air authorities. You cannot defend London against air attacks by anti-aircraft artillery alone. The guns can assist best by keeping hostile aircraft at an altitude where no particular target is clearly visible. Then squadrons of defensive aircraft must attack again and again, until the enemy is defeated or driven off.

Whilst any possible enemy can place bombing aircraft over London, we would be mad to neglect our means for carrying the attack into enemy aerodromes, to destroy their aircraft and ground organization immediately war is declared, and make as perfect as we can all defensive means at our disposal. Consequently, for the defence of important centres like London, Portsmouth, Devonport, etc., we require an anti-aircraft corps, with its guns, searchlights, and control positions with defence squadrons of aeroplanes.

Then squadrons of aeroplanes are needed to meet the attacking squadrons before they reach our coast, and other squadrons of aeroplanes to attack immediately the enemy's aerodromes.

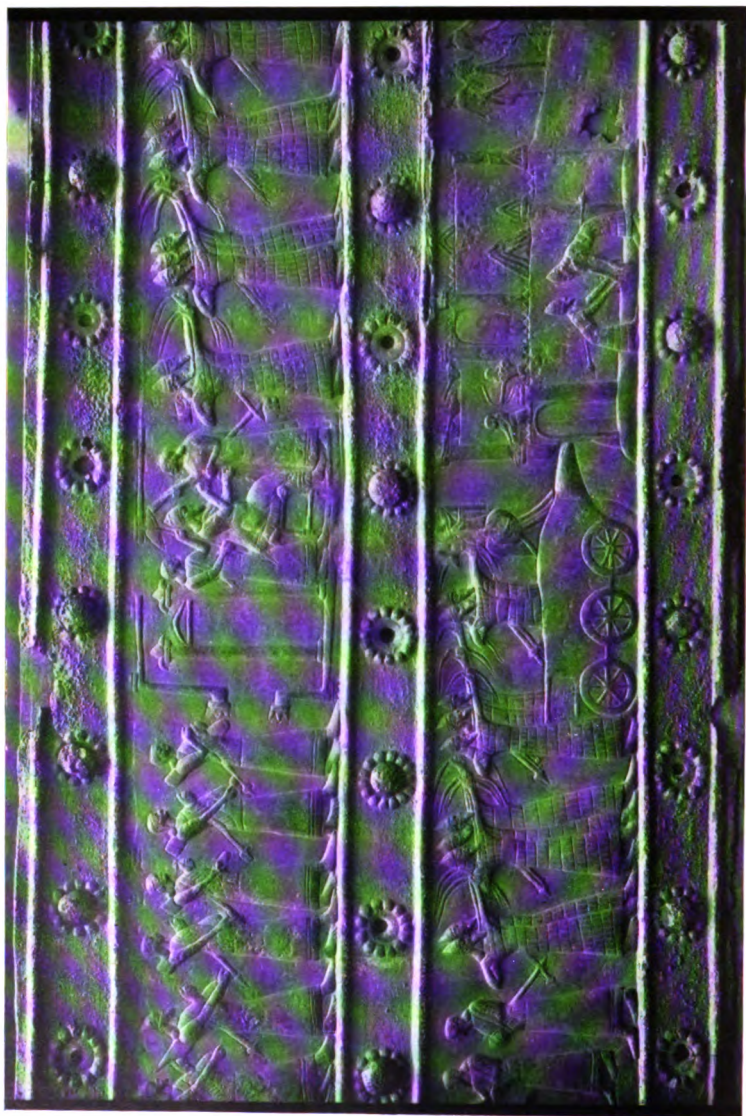
In this way the hostile air squadrons can be harassed as much as possible.

Also, an enemy would be likely to make every effort to inflict damage upon our food-carrying ships from the air. The bomb and locomotive torpedo dropped from aircraft would be the chief weapons used. These can do far more damage to our food ships than the submarine ever did, should we neglect to provide adequate defensive squadrons of aircraft for the protection of our shipping centres. The Navy and Army are powerless to prevent these attacks. To protect our shipping from air attack is a part of the independent mission of the Air Force.

In my judgment, it is the duty of all statesmen, of whatever party they belong to, to see that the maximum amount of foodstuffs are grown in this country. It becomes the duty of all public men, as Lord Lieutenants, High Sheriffs, Lord Mayors, Mayors, Chairmen of County Councils, Chairmen of Urban District Councils—whatever their politics may be—to recognize the danger of food shortage, not only by attack on our food-carrying ships by submarines, but also by aircraft, and be prepared for it. This ever-increasing danger to our food supply as aircraft develop may be disagreeable knowledge. But it must be faced.

In a war of the future, the ultimate result will largely depend on how efficiently the Air Force is maintained in peace time with regard to personnel and material and how well the personnel is trained in their independent duties, and their work with the naval and military forces.

We all trust that there will be no more European wars, but it is prudent for a great nation like ours to consider all risks, and take all defensive precautions to meet them, particularly in safeguarding our great seaports, cities, industrial centres, and the food supplies of our people, which are now open to attack not only from submarines, but from bomb and torpedo-dropping aircraft.



ASSYRIAN ARMED CAR

As shown on bronze bands taken from Gates of Shalmaneser II, King of Assyria, 860 B.C. to 825 B.C. (British Museum)

CHAPTER VII

THE EVOLUTION OF THE "TANK" FROM THE ARMOURED CAR OF THE ROYAL NAVAL AIR SERVICE

It is better to suffer wrong than to do it, and happier to be sometimes cheated than not to trust.—JOHNSON.

HISTORY teaches us that, generally speaking, fighting men throughout the ages have been equally courageous, and the success that one side or the other has achieved has been in part due to a small body of men, or sometimes a single man, who has adapted the science of the period to produce a new weapon, as a flint axe, a spear, sword, or some new form of protection.

In the early Assyrian days, the protective quilted coats, wicker-work and wooden shields were no doubt most useful in the conflicts of that period in keeping out a thrust with a spear or a cut with a sword; the body-armour of the Spartans was similarly useful. The cats, with their battering rams, catapults, pikes, lances, longbow and crossbows—all these weapons played a part in their day. (Plate 38.)

For are we not told that at the Battle of Crécy, victory went to the light archers over the more heavily-armoured horsemen, and at Falkirk the English bowmen broke up the finest spearmen of Scotland, and it is common knowledge that the invention of gunpowder made obsolete for all time the weapons for close-quarter fighting, and eventually swept away the feudal system.

There is little doubt that, in fulfilling man's destiny throughout the centuries, ideas have always been abundant, more particularly in war time. But they are of little use unaccompanied by practical demonstrations to ascertain if any one is of value to the fighting man.

Ideas alone are quite useless.

In these modern days, with their great scientific developments, much thought and systematic large scale experiments are required to evolve a new weapon of war.

The following verses seem to me to aptly portray that at the back of every new invention a guiding hand, who is the "Thinker," is required.

Back of the beating hammer,
By which the steel is wrought,
Back of the workshop's clamour,
The seeker may find the Thought,
The thought that is ever Master
Of iron and steam and steel,
That rises above disaster
And tramples it under heel.

The drudge may fret and tinker
Or labour with lusty blows,
But back of him stands the Thinker,
The clear-eyed man who knows ;
For into each plough or sabre,
Each piece and part and whole,
Must go the brains of labour,
Which gives the work a soul.

Back of the motor's humming,
Back of the bells that sing,
Back of the hammer's drumming,
Back of the cranes that swing,
There is the Eye which scans them,
Watching through stress and strain,
There is the Mind which plans them—
Back of the Brawn, the Brain.

Might of the roaring boiler,
Force of the engine's thrust,
Strength of the sweating toiler,
Greatly in these we trust,
But back of them stands the schemer,
The Thinker who drives things through,
Back of the job—the Dreamer
Who's making the dream come true.¹

¹ "Back of the Brawn, the Brain," by Berton Braley, in *American Machinist*.

In the following pages I will give a very brief description of the evolution of the naval airmen's armoured car that gave us the caterpillar landship that was successfully developed into the tank.

On the 25th August, 1914, I ordered Squadron-Commander Samson to report himself at the Admiralty, and gave him orders to take his air squadron to Ostend, as I thought at that time Ostend would be a good temporary advanced air base for keeping the Channel under close observation during the passage of the Expeditionary Force.

The machines available were rather an odd assortment, consisting of Blériot monoplanes, Sopwith biplanes, B.E. biplanes, Henry Farman biplane, a converted Short machine,¹ etc.

But this did not matter to Samson. Whether flying, or in a motor-car with little or no armament, was a matter of indifference to him; he seemed to be in his element taking risks. At first I did not understand Samson. He always reminded me of what one reads of Francis Drake. Until you knew him, a most difficult man to deal with. But once he saw that a Senior Officer was full out to help him in every possible way, he was a different person. No job was too difficult for him to undertake, and his men would follow him anywhere. The work he did with the first armoured cars at Dunkirk is historical. He practically carried out a small war on his own.

Whether at Skegness, Eastchurch, Dunkirk or Dardanelles, I found Samson always ready to do any risky work in the air or on the ground, and when most men of his age have given up flying, I notice him last year² taking a flight of Fairey III³ machines from Cairo to the Cape, as if it were an everyday occurrence. Hats off to Samson, one of the best pioneer naval airmen we ever had!

His exploits would fill a book, and I hope one day, when he gives up flying, he will write his reminiscences, and turn to

¹ Converted from a seaplane to a land machine.

² 1927.

³ Built by that well-known capable seaplane and aeroplane constructor, Mr. Fairey.

family affairs, for the more men we have of his type in this country the better for our forward progress.

When Samson was at Ostend, I got into communication with Mr. Sarell, our very able British Vice-Consul at Dunkirk. He was the first person to telephone to me to suggest that we should form a permanent naval air station at Dunkirk, for working with the French, and also for certain diplomatic reasons which he did not disclose. He informed me that there was a small aerodrome that he had no doubt the Governor of Dunkirk would give us, if he was diplomatically approached. We were then considering Samson's recall, as the Marines, who had been operating near Ostend, had been recalled to Dunkirk.

I reported this conversation to Mr. Churchill. He had already been approached by the Foreign Office with a request to keep our Naval Air Squadron at Dunkirk, and I asked permission to create a naval air station at Dunkirk. Mr. Churchill said he was not at all certain that we could hold Dunkirk, and suggested Calais as an alternative. After some discussion, Mr. Churchill had the following minute drafted—

The largest possible force of naval aeroplanes should be stationed in Calais or Dunkirk. Reports have been received, and it is also extremely probable, that the Germans will attempt to attack London and other places by Zeppelin airships, of which it is said a considerable number exist. The close proximity of the French coast to England renders such an attack thoroughly feasible. The proper defence is a thorough and continual search of the country for 70 to 100 miles inland with a view to marking down any temporary airship bases or airships replenishing before starting to attack. Should such airships be located, they should be immediately attacked. Commander Samson, with Major Gerrard as second-in-command, will be entrusted with this duty; and the D.A.D. will take all steps to supply them with the necessary pilots, aeroplanes, and equipment.

Mr. Churchill marked this minute, dated 1st September, 1914, in the following order to the Director of Air Department (myself), the Fourth Sea Lord, and Chief of Staff. As soon as these instructions were made official, I dispatched some air officers to inspect the site of the Dunkirk aerodrome, and on

receiving a favourable report, I went to Dunkirk finally to fix up matters with the French authorities.

Mr. Sarell's help to myself and our naval airmen was invaluable. No trouble was too much for him to take, and I feared we worried him much. He even had to get money to pay our men, so pressed were we for staff in those difficult times at Dunkirk. All the airmen who benefited by Mr. Sarell's good help will be everlastingly grateful to him. Mrs. Sarell was no less helpful, and she shouldered a good deal of the burden in making the airman's task easy at Dunkirk. The long hours this good lady worked in helping in the Consul's office on the 'phone and in other directions earned the admiration of us all.

I asked the First Lord to have Mr. Sarell officially thanked, and the following is a copy of the letter sent to him from the Foreign Office—

FOREIGN OFFICE.

MY DEAR SARELL,

The First Lord has asked Sir Edward to convey to you—after reading your letters to Crowe—the Admiralty's appreciation of your robust and sensible views, and of your energetic support of naval aeroplane operations.

I need hardly say that it gives Sir Edward great pleasure to comply with this request.

Yours sincerely,

(Signed) W. TYRRELL.¹

From my official reply to Mr. Churchill's minute of 1st September, 1914, and other instructions about speeding-up the delivery of aeroplanes, I extract the following²—

CARS FOR ATTENDING ON MACHINES

Most
important
to proceed
reporting
scheme in
detail.

These should be armed with a light gun. They would assist in forming temporary bases for the machines so as to enable the aeroplanes to extend their flights to a greater distance.

100

About 50 will be required; as the autumn wet weather will soon be coming on, it will be necessary to provide tents for the aeroplanes at Dunkirk.

¹ Sir William Tyrrell was at that time Sir Edward Grey's private secretary.

² Dated 4th September, 1914.

It is anticipated that a system of special airship watchers from points connected to the telephone can easily be organized over the country which will greatly reduce the number of aeroplanes which need be left patrolling. An airship can be much more easily seen from the ground than from the air.

Attacks on airship sheds at Dusseldorf and Cologne.

Make proposals.

With four machines armed with 20 lb. bombs and petrol bombs a useful attack on these sheds might be brought off. The machines could operate near the frontier to eastward of Antwerp.

Motor-cars would supply this temporary base with petrol bombs, etc.

My reader will see on page 8 how successful we were in the air attacks on Dusseldorf, etc.

The remarks in the margin are Mr. Churchill's instructions.

But the point I wish to draw particular attention to in my minute is the proposal to arm a large number of motor-cars with a gun, and Mr. Churchill altered my figure of 50 into 100. The First Lord's approval on this paper led to the building of the naval airmen's armoured car force that we created at Wormwood Scrubs, and we were fortunate in having such a good place as the *Daily Mail* airship shed,¹ which was soon adapted to our purpose.

My difficulty was to get guns for these cars. (Plate 39.)

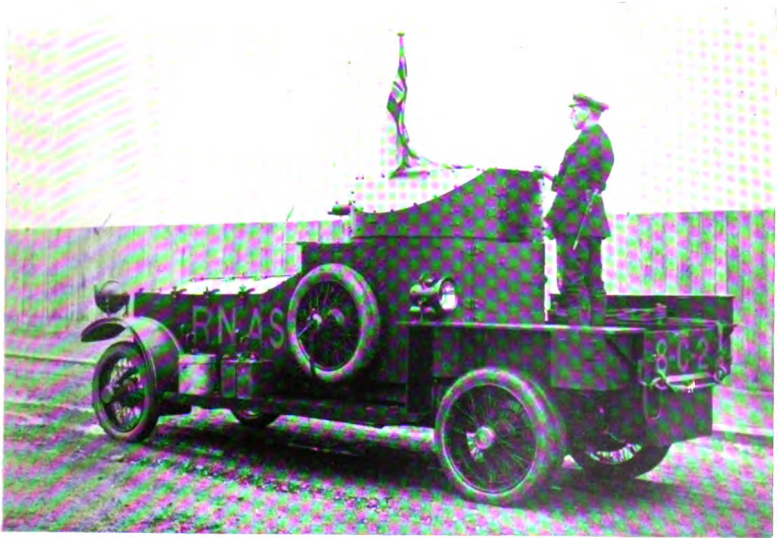
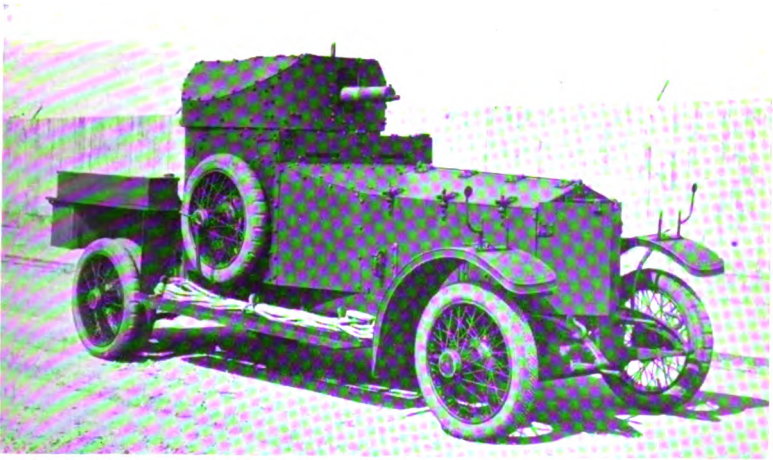
But the Director of Naval Ordnance² kindly came to the rescue, and raised from different places some Maxims, and afterwards was good enough to spare a few naval three-pounders for the heavier armoured cars that we constructed at a later date. (Plate 40.)

Mr. Churchill, writing in what, in my judgment, is the finest book of the War, states—

I gave . . . successive orders for the formation of armoured car squadrons under the Admiralty. The first few cars had scarcely begun to show their advantage in Commander Samson's guerilla from Dunkirk when the difficulty which ultimately led to the creation of the tank manifested itself.

¹ Kindly placed at the disposal of the Royal Naval Air Service by Lord Northcliffe.

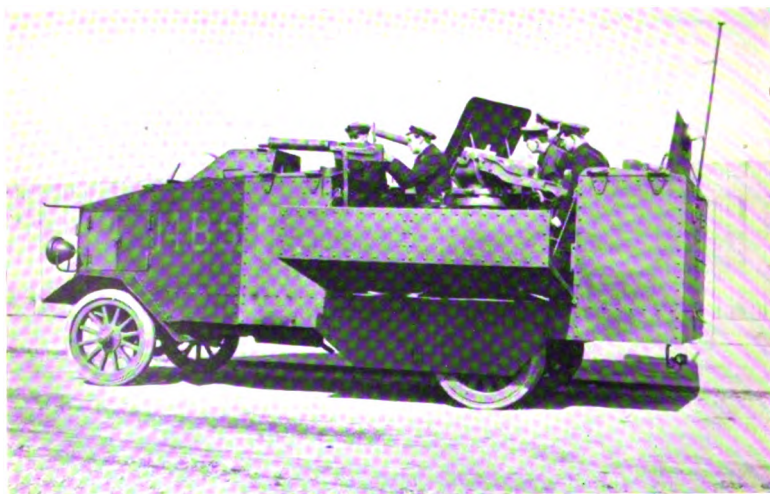
² Vice-Admiral Sir Morgan Singer.



ROLLS-ROYCE ARMoured CAR (REVOLVING TURRET TYPE)
First car built December, 1914



ROYAL NAVAL AIR SERVICE HEAVY ARMoured CAR
(Seabrook 5-ton), armament naval 3-pr. gun, 4 Maxims. First car delivered
5th February, 1915. Used at Ypres by Sir John French



ARMOUR 8 MM. STEEL PLATE
Side armour protection down, port bow maxim in position

That difficulty was that our armoured cars, although fitted with boards, as shown in Plate 39, for crossing ditches, were practically valueless for cross-country work, when the Germans dug themselves in, and we had great difficulty in getting the tyres and wheels to stand up to the load of armour-plating, gun, ammunition, crew, and baggage.

Early in January, 1915, I put forward the following minute to the First Lord, Mr. Churchill—

Submitted

With a view to providing forces operating on land with a method of breaking down the resistance of the enemy when he resorts to "siege warfare," a new weapon has been proposed by Flight-Commander Hetherington of the R.N.A.S.

It may be briefly described as a cross-country armoured car of high offensive power.

It consists essentially of a platform mounted on three wheels (of which the front two are drivers and the stern wheel for steering), armed with three turrets, each containing two 4 in. guns, propelled by a 800 h.p. Sunbeam Diesel set, electric drive to the wheels being employed. The engines as well as the guns and magazines would be armoured, but not the purely structural part, which would be fairly proof against damage by shell fire if a good factor of safety is used and a superfluity of parts provided in the structure.

The problem of design has been cursorily examined by Air Department officers and the following rough data obtained—

Armament	3 twin 4 in. turrets with 300 rounds per gun.
Horse-power	800, with 24 hours' fuel or more if desired.
Total weight	300 tons.
Armour	3 in.
Diameter of wheels	40 ft.
Tread of main wheels	13 ft. 4 in.
„ steering wheel	5 ft.
Overall length	100 ft.
„ width	80 ft.
„ height	46 ft.
Clear height under body	17 ft.
Top speed on good country road	8 miles per hour.
„ „ bad „ „	4 „ „

The above particulars must be regarded as approximate and cannot be guaranteed, owing to the absence in the Department of technical knowledge properly applicable to this problem. These particulars are, however, quoted in the belief that they can be readily worked to.

The cross-country qualities of the machine would appear to be good. It would not be bogged on any ground passable by cavalry. It could pass over water obstacles having good banks up to 20 ft. or 30 ft. width of waterway if deep. It could ford waterways with good bottom if the water is not more than 15 ft. deep. It could negotiate isolated obstacles up to 20 ft. high. Small obstacles, such as banks, ditches, bridges, trenches, wire entanglements (electrified or not), it would roll over easily. It could progress on bottom gear through woodland of ordinary calibre.

The greatest disabilities of the machine appear to be as follows : It cannot cross considerable rivers except at practicable fords, which practically means that it cannot operate as a detached unit in country held by the enemy where this involves the systematically opposed crossing of big rivers. It can be destroyed by sufficiently powerful artillery. It can be destroyed by land mines.

The machines might on occasion do good service by destroying railway lines in the enemy's rear, but its most important function would appear to be in destroying the enemy's resistance over any region where he does not possess other guns than field guns or howitzers.

It would appear at first sight that the machine ought to be more heavily armed and gunned, but considerations of the disproportionate weight of the guns and of time of building have resulted in the proposal being reduced to the comparatively moderate one described above.

Mr. Churchill referred these proposals to Lord Fisher, then First Sea Lord, and he detailed Sir Percy Scott, one of our famous gunnery Admirals, to look into them.

Sir Percy Scott held a conference, at which I attended, accompanied by Squadron-Commander Briggs and Flight-Commander Hetherington, and other interested air officers. Sir Percy Scott reported against the whole idea of land battle-ships, on the ground that heavy artillery would wreck them before they could be brought into use.

Before the Germans dug themselves in, our armoured cars did

well. Major-General C. M. Kavanagh, commanding the Second Cavalry Division, reported as follows, on 27th May, 1915—

The section of armoured cars with Maxim guns that has been attached to this division have rendered excellent service during the late operations near Ypres.

They are most useful for reconnaissance and for conveying staff officers through dangerous zones and although the opportunity has not arisen when they could fulfil the rôle of attack or pursuit I consider them a valuable arm for this purpose in conjunction with cavalry.

The retention of the armoured cars with this division is, in my opinion, very desirable and I would further recommend that each section should be supplemented by the addition of the following—

(a) Four cycle side-cars armed with Maxims.

(b) Two three-pounders on trailers drawn by armoured cars, which I believe exist.

Also, General De Lisle's report is of interest, as he stated—

The section of armoured motor-cars attached to the First Cavalry Division was employed in action on 24th May throughout the day and part of the night.

The situation that day was such that any movement from the support and reserve trenches to the forward trenches could only be made at considerable loss of life. All telephone communication was cut, and owing to the asphyxiating effects of the gas, information by human means was not forthcoming from the front trenches. Under these circumstances, the armoured cars proved of the greatest possible assistance.

Although the Ypres-Menin road was being heavily shelled, the cars were taken up to the Birr cross roads and returned with valuable information. At another time the cars were called on for offensive action, and there is little doubt that their fire effect assisted in checking any further advance of the Germans. The crews and drivers behaved well under fire, and could always be relied on thoroughly to carry out their orders.

The men in the fire trenches, who had been cut off from communication to Brigade Headquarters, state that the sight of the cars advancing up the Menin road had a most inspiring effect on their moral, as it was evident that the cars would prevent any attempt being made to turn their flank, once the gap in the line had been made.

It is considered that in trench warfare and in any future advance these armoured cars would prove a most valuable addition to a cavalry division.

OFFICER COMMANDING
ARMoured CAR SQUADRON,
1st CAVALRY DIVISION.

Forwarded for your information. This is a copy of the report sent in by G.O.C., 1st Cavalry Division, on the operation of the 24th May.

(Sgd.) A. F. HOME, LT.-COL.,
1st Cavalry Division.

When the armoured cars were of no further use at the Front, a squadron of them was sent to Egypt, under the command of the Duke of Westminster, and carried out very valuable services. The gallant Duke was awarded a D.S.O. in recognition of his good work. I have an amusing recollection of seeing the Duke of Westminster looking extremely miserable when paying the men of his armoured car squadron in pouring rain at Wormwood Scrubs Naval Air Station, and getting a little mixed up with the small coins that are always such a bother on these occasions, in getting the amount payable to each man accurate.

Another armoured car squadron was taken by that intrepid man, Commander Oliver Locker-Lampson, C.M.G., D.S.O.,¹ to Russia.

Locker-Lampson is a born leader. He does not know such a thing as fear, or what a difficulty is. He likes overcoming them, and his work during the War in Belgium, Russia and Rumania would make most interesting reading, could we persuade him to write a book giving the full story of his gallant deeds with his Royal Naval Air Service armoured cars, commencing from the time he went across the Channel, then to Russia and Rumania, and return to this country.

I recollect being most interested in the Commander's dispatches from Russia, particularly in his interview with the late Czar, when he stated that His Majesty had the cause of the Allies very much at heart. This combated the view that

¹ Member of Parliament for Handsworth.

had been basely circulated in this country that he was faithless to the Allied cause.

Commander Locker-Lampson's dispatches from Rumania were equally interesting. In that country his armoured cars performed services of great value, and he came into close contact with the late King of Rumania, who did so much for his country.

I have heard that Admiral the Duke of Edinburgh's daughter, the beautiful Queen of Rumania, and her handsome daughter, the Queen of Greece, were very interested in our naval armoured cars, and showed the crews very much kindness.

At the hearing of the Royal Commission on Awards to Inventors,¹ it was disclosed that Mr. Churchill, in answer to a memorandum prepared by Captain Hankey² on the subject of special mechanical devices, wrote to the Prime Minister a letter dated 5th January, 1915, from which I extract the following—

It would be quite easy in a short time to fit up a number of steam tractors with small armoured shelters, in which men and machine guns could be placed, which would be bullet-proof.

Used at night, they would not be affected by artillery fire to any extent. The caterpillar system would enable trenches to be crossed quite easily, and the weight of the machine would destroy all wire entanglements.

This, of course, was a secret letter. But, for some extraordinary reason, no special action was taken on it by the War Office.

In the middle of January, 1915, talking the whole position over once more with Mr. Churchill in his room at the Admiralty, he desired me to carry out the following experiment. In making the suggestion he warmed up to his subject, and, in fact, got quite excited, being carried away by enthusiasm for his idea. Striding up and down his room, he outlined what was in his mind, and drafted the following minute. Whilst doing this,

¹ *Minutes of Proceedings, Royal Commission on Awards to Inventors*, 7th October, 1919, page 3.

² Now Sir Maurice Hankey, G.C.B., etc.

at intervals, he would stop and say, "We must crush the trenches in, D.A.D.¹ We must crush them in. It is the only way. We must do it. We will crush them. I am certain it can be done."

He then proceeded—

I wish the following experiment made at once. Two ordinary steam rollers are to be fastened together side by side with very strong steel connections, so they are to all intents and purposes one roller covering a breadth of at least 12 to 14 ft. If convenient, one of the back inside wheels might be removed, and the other axle joined up to it. Some trenches are to be dug on the latest principles somewhere handy near London in lengths of at least 100 yd., the earth taken out of the trenches being thrown on each side, as is done in France. The roller is to be driven along these trenches, one outer rolling wheel on each side and the inner rolling wheel just clear of the trench itself. The object is to ascertain what amount of weight is necessary in the roller to smash the trench in. For this purpose as much weight as they can possibly draw should be piled on to the steam rollers and on the framework buckling them together. The ultimate object is to run along a line of trenches, crushing them all flat and burying the people in them. If the experiment is successful with the steam rollers fastened together on this improved system, stronger and larger machines can be made with bigger driving wheels and proper protection for the complements, and the rollers of these machines will be furnished with wedge-shaped ribs, or studs, which can be advanced beyond the ordinary surface of the wheel when required, in order to break the soil on each side of the trench and accentuate the rolling process. The matter is extremely urgent, and should be pressed to the utmost. Really the only difficulty you have got to surmount is to prevent the steam rollers from breaking apart. The simplicity of the device, if it succeeds, is its virtue. All that is required is a roller of sufficient breadth and with wheels properly fitted and an unscaleable, bullet-proof house for the crew. Three or four men would be quite enough, and as the machine is only worked by night it would not be required to stand against artillery. In a fortnight I wish to see these trials.

These steam-roller instructions were dated 18th January, 1915, and marked to Director of Air Department (myself) and Third Sea Lord, Admiral Sir Frederick Tudor-Tudor.

¹ Short for my official title of Director of Air Department.

As a first action, I referred the First Lord's instructions to Lieutenant Barry, my motor-car expert, and his report is as follows—

20th January, 1915.

D.A.D. *Submitted.*

With reference to the attached letter from the First Lord, I have to-day visited Aldershot and inspected trials made with an American Holt caterpillar. The machine is, I believe, the most efficient form of tractor in existence, and the manner in which it goes over rough ground, soft ground, ditches, inequalities, up hill and down hill, is nothing short of marvellous. I saw it hitched on to a traction engine weighing 16 tons in soft ground, and it walked away with this as if it were no weight at all; they then hitched it on to the front of the traction engine at an angle of 45° with the direction in which the traction engine was pointing; with equal ease as before it hauled it away, the front wheels of the traction engine tearing up the ground.

From inquiries made with regard to the joining of two steam rollers together, it appears that if this were possible to do, and this machine was driven along a trench and did not break in half, the middle wheels would be supported by the outside wheels and it would not have the desired effect of rolling down the trench. I might add here that steam rollers would be absolutely useless for this, as they would immediately become bogged in any soft earth, being made only for hard road service. Agricultural tractors might be utilized, but they would also, if the ground was very soft, become easily bogged. Any steam roller or tractor would be very hard to armour-plate sufficiently to give protection both to the driver and vital parts of the engine. This also applies to the caterpillar above referred to.

The only suggestion I have to make is that two caterpillars, one on each side of the trench, be harnessed to a very heavy roller, but as their pace would be so very slow, the occupants of the trenches would have plenty of time to get out and escape. It is also extremely doubtful if any form of roller sufficiently heavy could be made, which would really and genuinely roll these trenches flat, considering that they are 6 ft. deep and varying from 2 ft. to 6 ft. across the top.

I submit that a possible method of attacking trenches would be to choose a day when the ground was frozen and utilize our armoured cars and armoured three-pounder lorries. If the ground was hard enough and these were fitted with non-skid chains, it is quite practicable to get them close up to the trenches. The only method for really attacking Germans in their trenches seems to be to have an enormous

machine with a plough attachment to it, with a roller behind it, which would walk along the side of the trench, smash in one side and then roll it down flat. All of this could be easily managed in connection with the Juggernaut, specification of which is attached.

After a considerable amount of trouble, we succeeded in coupling up two steam-rollers together. But I was only able, with the assistance of Lieutenant Barry, to keep them coupled for a short time. But this, however, was sufficient to enable me to make the following report to Mr. Churchill well within the time he had given me.

Submitted.

In accordance with your directions two steam rollers were obtained for the purpose of testing the possibility of their use for rolling down trenches.

A section of a trench was dug at Wormwood Scrubs where the land consists of hard clay, at present in a damp condition, but by no means soft.

On starting up the engines, however, the steam rollers broke apart. Three more trials were made with the same result, and it is not considered possible, on account of the design of the ordinary steam roller, to securely fix two together without practically rebuilding the engines.

In order to test the possibilities of this scheme further, tests were then carried out with a single roller. This was first of all run at full speed against the face of the trench, which consisted of a bank about 2 ft. high composed of a portion of the clay thrown out in making the trench. It was only just possible for the roller to move over the ground, and on reaching this slight bank it stopped dead, the driving wheels merely revolving and digging themselves deeper and deeper into the earth despite the fact that they had been wound round and round with 3 in. hemp rope to give them a better grip.

This engine was extricated and got on to a prepared plank roadway again for further tests with the help of the second engine working from this roadway.

Several more tests were made, approaching the trench from different directions, with exactly similar results.

The steam roller would not climb the slightest inclination.

These experiments prove that the loading of a steam roller is too high for it to be successfully used over agricultural land and that a machine to perform this work must be specially designed of a greater

total weight and with very much greater wheel surface, and particularly much greater diameter wheels.

A machine of this description would be very costly to produce and would probably be very difficult to bring into action. Also it could be easily mined.

Although Sir John French liked the R.N.A.S. three-pounder heavy armoured car, and asked Mr. Churchill for more, they were not really a success. The guns in our three-pounder cars were not powerful enough, and the cars could not cross even a small road trench except with the aid of planks, and only then under the most favourable conditions, as the crew had to expose themselves to snipers, shell fire, etc., whilst laying the planks. (Plate 40.)

Nothing was done after the steam roller experiments for some days, and we were no nearer a solution of the problem.

Mr. Churchill told me it was up to me to do something, otherwise I had failed him in his endeavour to defeat "No Man's Land." Mr. Churchill would not drop this matter, and whenever I had to obtain approval from him on air matters he always swung back to this subject. In fact, he went for me nearly every day about it. He would put his hands under his coat, stride up and down the room with his head bent forward, and say: "Now, D.A.D., put your best brains into this problem."

Lieutenant Barry brought me in a bill about this time for £1,500 for springs for the armoured cars. The weight of the armour, ammunition, guns, crew, baggage, etc., was proving too much for these vehicles when crossing a small shell hole, dips in the road, etc., and I had visions of more money being required for this purpose out of the small amount I was allowed for air development. On thinking about Mr. Churchill's steam-roller idea more carefully, and reasoning the matter of the failure more closely, I came to the conclusion that we were quite on wrong lines—the loading of the steam roller was too high, and our motor-car wheels, tyres, and springs were all wrong.

We required not a heavily-loaded machine, but the exact opposite. That was a lightly-loaded machine with the load distributed over as wide an area as possible. This seemed to me to be the solution and evidently pointed to a caterpillar machine of some description, as I had no great faith in Flight-Commander Hetherington's big-wheel machine, the detail of which is given on pages 185 and 186.

At this time caterpillar traction was not entirely unknown to me, so I advised Captain Robert Scott, of Antarctic fame, who was a brother torpedo man and old station mate of mine in the Pacific and Channel Squadrons, how to get his caterpillar sleigh built, and what firm to go to. He knew I had had considerable experience in running the first Holland submarine boats that were fitted with American petrol engines, and my "A 1" submarine¹ was fitted with a petrol-engine designed by Mr. Herbert Austin,² of the Wolseley Co., a very capable designing engineer. From what I remember, the Wolseley Co. built two or three motor sleighs for Scott, and he carried out some trials with these machines in Norway.

Also one of my officers, Lieutenant R. F. Macfie, sent me in on 5th November, 1914, a report on how to use caterpillar machines for hauling heavy guns.

In concluding his memorandum, Lieutenant Macfie wrote—

It is the writer's conviction that with a group of six caterpillar tractors and with a competent crew manager, weights of 85 tons, i.e. the weight of a 12 in. naval gun, could be moved over the remains of roads (they will be destroyed) which will be encountered on the advance into Germany at a speed of 20 to 40 miles a day. It is also the writer's conviction that the construction of a "floating" foundation capable of dealing with the recoil of these guns, built up of short lengths (say 5 ft.) of 12 in. beams and angle brackets and bolts and nuts (not rivets), so as to be easily and rapidly assembled in a few hours by field labour, presents no undue mechanical difficulties.

Flight-Commander Hetherington, in minuting this paper to Wing-Commander Boothby, stated—

¹ Described in my submarine book.

² Now Sir Herbert Austin, of motor-car fame.

I think much valuable information might be gained if this unit had one of these machines at advanced base. Also it would be very valuable in getting broken-down armoured cars back to base when the roads are bad.

I was getting rather fed-up and exasperated at Mr. Churchill's policy of giving me all the hard nuts to crack, as anything new he wanted was always given to the Air Department, a compliment we did not, with so much air work on hand, always appreciate. Nevertheless, I was making every endeavour to get out a useful weapon for trench warfare to keep this forceful man quiet.

On 16th February, 1915, I went to Mr. Churchill's room in the forenoon, and reported to him I had solved his steam roller problem in another way, and would he attend a demonstration on the Horse Guards Parade that afternoon.

Mr. Churchill said, "I still believe there is something in my heavy steam roller idea." But I told him my scheme was better, and he agreed to attend the demonstration. Although Mr. Churchill was most unreasonable at times in expecting me to do a great deal with air machines, armoured cars, anti-aircraft defence of London, etc., he was quick-brained, and a good Chief to work for, and although we had a very limited amount of money and small staff, Mr. Churchill seemed to place extraordinary trust in the Air Department's ability to overcome obstacles.

During the forenoon of 16th February, I ordered Flight-Commander Hetherington to go to Fulham, to obtain a small caterpillar machine that I had some knowledge of from Mr. Diplock, managing director of the Pedrail Transport Co., Ltd. Mr. Diplock's catalogue was then in my possession, as I had been studying it and also some American papers¹ and catalogues showing caterpillars that Squadron-Commander Briggs had obtained for me.

Flight-Commander Hetherington arrived with the Diplock caterpillar truck on the Horse Guards Parade during the

¹ *Scientific American*, of 18th February, 1911.

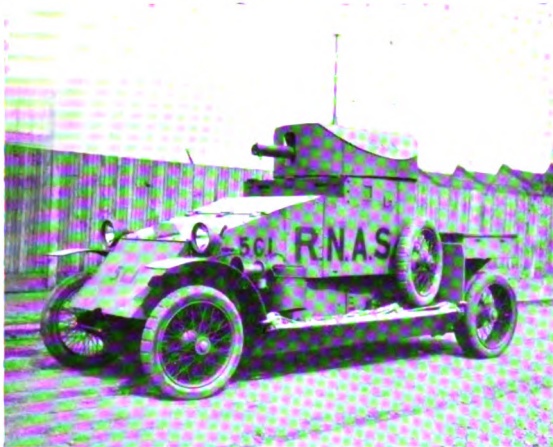
afternoon of 16th February, 1915, accompanied by Mr. Diplock and Mr. Brackenbury. I then gave to Mr. Churchill my proposals for building a machine for crossing "No Man's Land" as follows—

With a long caterpillar fitted under one of our turreted armoured cars each side, you could do away with all the spring difficulties. The load would be better and more evenly distributed, and you could increase the armament, i.e. calibre of guns, amount of armament carried, etc. The planks we had fitted to our armoured cars could be done away with. This would relieve the men from exposure to shell fire when placing them across small shell holes, ditches dug in roads, etc. (See photographs of planks, Plates 39 and 41). We had received complaints about these planks exposing the crews when laying.

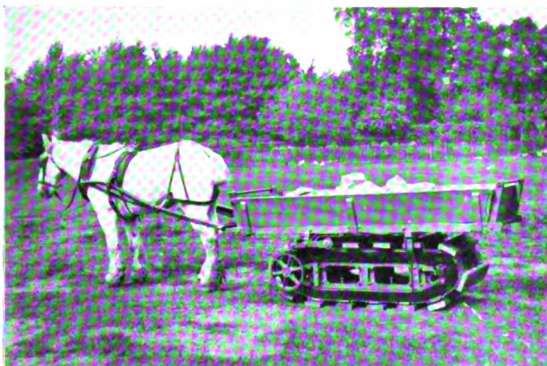
Barbed wire could be easily rolled down or cut if a torpedo net cutter was used. The crew would be properly protected, and all the controls would be inside, as in our revolving-turret armoured cars, and not exposed, as in the three-pounder heavy armoured cars.

I pushed the caterpillar truck, loaded with large stones, about with my hands, to show Mr. Churchill how easily it could be manipulated, explained the caterpillar system as far as I knew it, and showed Mr. Churchill how our spring difficulties could be overcome. (Plate 41).

Mr. Churchill then pushed the caterpillar truck about the Horse Guards Parade, and was amazed at the ease with which this truck with a full load of large stones could be moved. Mr. Churchill has the sharpest brain for grasping a new idea that I have ever met. He at once saw that my proposals were sound and better than his steam roller idea or Flight-Commander Hetherington's giant wheel scheme. And after considerable discussion it ended in Mr. Churchill being quite satisfied that our turreted armoured cars could be constructed with caterpillars instead of wheels, and he gave me approval to build 18 landships before any other Department or firm



LANCHESTER ARMoured CAR
Showing planks for crossing ditches, January, 1915



THE DIPLOCK CATERPILLAR TRUCK
Used by the Author on Horse Guards Parade, 16th February, 1915, to demonstrate to Mr. Churchill how caterpillars could replace wheels of armoured cars



THE NAVAL AIRMEN'S FIRST CATERPILLAR LANDSHIP
Built with Bullock caterpillar tracks, obtained from America on advice of Colonel Crompton, R.E., September, 1915

came into the picture. After my demonstration to Mr. Churchill was over, I ordered one of my air officers to ask Mr. Tennyson D'Eyncourt if he could spare the time to have a look at the Diplock caterpillar truck. This he did, and at my request he was associated with me in the First Lord's approval to build these landships.

Mr. Diplock and Mr. Brackenbury attended this demonstration on behalf of the Pedrail Transport Co. They placed most readily all the information they had about caterpillar machines at our disposal, and were very helpful in every way.

Mr. Diplock got out for me the first drawing of a caterpillar landship¹ that was produced in the War, with conning tower, etc. I limited the weight of this vehicle to 15 tons, and the Transport Co. have this drawing in their possession. The letter of the Pedrail Transport Co. of 12th October, 1916, is produced in full, when I asked them for a photograph of their caterpillar machine—

PEDRAIL TRANSPORT, LIMITED,
Manufacturers of
Pedrail Tractors and Trailers,
Pedrail Logging Wagons,
Pedrail Trains,
etc., etc.

WYFOLD ROAD (near Munster Road),
FULHAM, S.W.
LONDON, 12th October, 1916.

COMMODORE MURRAY F. SUTER, R.N.,
Air Department,
ADMIRALTY, S.W.

SIR,

We beg to acknowledge receipt of your letter of the 11th inst., and have pleasure in enclosing a photograph of the Pedrail which we showed you and Mr. Churchill on the Admiralty Parade. We are also enclosing a copy of an illustrated paper, *The Daily Call*, dated the 17th February, 1915, on the front page of which you will see an illustration headed "The Vogue of the Caterpillar," with some purely

¹ This first drawing of our caterpillar landship was placed before the Landship Committee on 4th March, 1915.

imaginative description underneath. As a point of fact, that illustration is a snapshot of the wagon on its way from our works to the Admiralty Parade, taken on the morning of the 16th February, 1915, by some press photographers.

We have the honour to be, Sir,
Your obedient Servants,
for PEDRAIL TRANSPORT, LIMITED.
(Sgd.) R. H. BRACKENBURY,
Director.

RHB/DC
Enclo.

In another letter to me, dated 30th May, 1919, Mr. Brackenbury wrote—

It was your department¹ that arranged for the demonstration of the Pedrail before Mr. Churchill, and on the other hand Mr. Churchill will no doubt remember your conversation² with him with reference to Pedrail armoured cars. Tritton's claim as the originator of the idea can readily be disproved by the production of the drawing which he submitted to the Admiralty Landship Committee on the 4th March³ at the same time we submitted the design⁴ which you have.

This design of Tritton's shows a traction engine on wheels with a kind of armoured shield in front of the driver.

This design was rejected in favour of our own and it was only months later that Tritton came forward with any other suggestion. Moreover, as he was continually up in Crompton's attic at Thriplands, seeing the designs being completed for our Pedrail landship, he could hardly claim originality for the caterpillar track idea.

In the early armoured cars I had to get the armour through the Director of Naval Construction, and knowing Mr. D'Eyncourt's great ability, from personal contact with him, I asked Mr. Churchill to associate him with me in producing these new caterpillar landships.

I explained the whole idea to the D.N.C.⁵ He said he knew nothing about armoured cars. I told him it did not matter.

¹ Air Department, Admiralty.

² In *Winston Churchill*, by Ephesian, this conversation is alluded to.

³ 1915.

⁴ This was the first drawing of a caterpillar landship that Mr. Diplock prepared for me.

⁵ D.N.C., short for Director of Naval Construction.

PLATE 42



FLIGHT-COMMANDER HETHERINGTON DRIVING " KILLEN-STRAIT "
TRACTOR OVER VARIOUS OBSTACLES

Royal Naval Air Station, Wormwood Scrubs, June, 1915



CATERPILLAR EXPERIMENTS, HETHERINGTON, STERN, McGRATH

R.N.A.S. Air Station, Wormwood Scrubs, June 1915



FLIGHT-COMMANDER HETHERINGTON DRIVING THE "KILLEN-STRAIT"
TRACTOR OVER BARBED-WIRE OBSTACLES

At the Royal Naval Air Station, Wormwood Scrubs, before Mr. Lloyd George and
Mr. Churchill, 30th June, 1915

The scheme was practicable, and only wanted working out. I informed the D.N.C. that Colonel Crompton, the big road traction expert, had told me that my ideas were sound, and that he was making more calculations with Mr. Le Gros, a friend of his, to verify his first opinion.

In talking to Mr. D'Eyncourt, I informed him that the Fourth Sea Lord had ordered me not to devote too much attention to armoured cars and neglect the Air Service, therefore I could not take a very active part in the building designs.

Mr. D'Eyncourt, in spite of his enormous responsibilities and big work as D.N.C., saw the point, and kindly agreed to run the show and I was to stay in the background. A committee was formed and all proposals were considered; at first Mr. Tritton, of Messrs. Fosters, did not like the caterpillar scheme, but at a later date he came round to it.

Acting on Colonel Crompton's advice, we purchased a Killen Strait caterpillar machine and some Bullock caterpillar tracks from America, for experiments, as shown in Plates 42, 45 and 46.

Although Flight-Commander Hetherington's¹ big wheel battleship did not come through, I cannot speak too highly of the intrepid way he drove the Killen Strait caterpillar over ditches, obstacles, barbed wire, etc.

I ordered Flight-Commander Hetherington and Wing-Commander Boothby to make a big demonstration at Wormwood Scrubs. This was done, and Hetherington drove a Killen Strait caterpillar over all sorts of obstacles that I had instructed Commander Boothby to prepare, before Mr. Lloyd George, Mr. Churchill, and other War Office officials. (See Plates 42, 43, 44.)

Had it not been for Hetherington's fearless driving of the first caterpillar machine, I doubt if the caterpillar landship scheme would ever have eventuated. This officer's services in this respect were of the greatest value, and seem to me to have been poorly recognized.

On 29th July, 1915, Messrs. Foster & Co., of Lincoln, were

¹ See pages 185 and 186.

instructed to build a landship with gear then at this firm's works, utilizing the 9 ft. Bullock trucks we had procured from America on Colonel Crompton's advice. (Plates 45 and 46.)

The 105 h.p. Daimler engine and transmission gear, as used in the howitzer tractors, were utilized. The turret was made a dummy and could not revolve, and the body was made of boiler plate to get the correct weight. The armament was one two-pounder automatic gun, with several Lewis guns and necessary ammunition. This machine was tested early in September,¹ and after some modifications a trial over trenches was made outside Lincoln.

The machine was very slow, and could only cross a 4 ft. trench. But it was a success. (Plates 45 and 46.)

This was the naval airman's caterpillar landship, and the first caterpillar machine built in the War. It was entirely for experimental purposes, and being an experimental success, it led the way to the construction of further caterpillar machines.

Mr. Tritton, a skilled engineer, and Lieutenant Wilson, one of my officers attached to the Royal Naval Air Service, were watching these experiments with much attention, and then Mr. Tritton produced "Little Willie," another experimental caterpillar landship, and, finally, his rhomboidal tank. Mr. Tritton's new design was tried at Hatfield Park in January, 1916. It was an enormous success, and I told every person of importance I could see at the trials that we wanted 3,000 of these machines. (Plate 47). The most notable departure from my idea Mr. Tritton had was to make the caterpillar run round the periphery instead of as shown in the photograph of the first R.N.A.S. tank. The French tank is more like the R.N.A.S. design. (Plate 51.)

Helping me at this time was Squadron-Commander Briggs. I cannot speak too highly of this officer's services in the Air Department. He was most successful with aeroplane engines, airship engines, cars for the S.S. and coastal airships, the armoured cars, and his engineering advice all the time he served

¹ 1915.



THE NAVAL AIRMEN'S FIRST "CATERPILLAR LANDSHIP"
Crossing trench at Cross Cliff Hill, Lincoln, 1915



THE NAVAL AIRMEN'S FIRST CATERPILLAR LANDSHIP ON THE (MODIFIED) BULLOCK TRACKS
Obtained from America on advice of Colonel Crompton, R.E., after they had been lengthened and given more camber

under me could not have been more helpful or more readily forthcoming.

I made certain administrative arrangements with the Landship Committee, in which the Director of Naval Construction and Director of Contracts concurred, before I issued the following orders—

REFERENCE SHEET

<i>From—</i> DIRECTOR OF AIR DEPARTMENT AT ADMIRALTY.	<i>To—</i> O.C. ARMoured CARS (COMMANDER BOOTHBY) FLIGHT-COMMANDER HETHERINGTON, COLONEL CROMPTON, R.E., Thriplands, Kensington Court.
--	--

Dated : 30th March, 1915.

5672.

INFORMATION REQUIRED, OR NOTIFIED

The following routine is to be observed in organizing and ordering material for the three new Squadrons of Armoured Cars.¹

All questions of design will be considered in Committee with D.N.C. and D. of C., O.C. Armoured Cars, Flight-Commander Hetherington, and Colonel Crompton.

Colonel Crompton to supervise the design and generally to assist, but should place no orders himself.

Flight-Commander Hetherington is to supervise the construction of the Cars. He is to forward copies of all drawings, when complete, to me, through O.C. Armoured Cars. He is to forward all proposals for purchase of material, etc., to O.C. Armoured Cars, who will bring them to me for approval and signature before forwarding them to the Director of Contracts.

The O.C. Armoured Cars is responsible for organizing the personnel of the new Squadrons and that I am kept informed of the progress of the work in a weekly report.

The new Squadrons are to be organized on exactly the same lines as the present Armoured Car Squadrons.

(Sgd.) MURRAY F. SUETER,
Director of Air Department.

30th March, 1915.

¹ We called the caterpillar machines under various names, as armoured cars, Pedrail machines, juggernauts, landships, and eventually tanks for secrecy purposes during their construction.

During the early experiments, Sir Tennyson D'Eyncourt came to me and said he wanted to resign from the Landship Committee. I had a very long conversation with him, and persuaded him to remain. These frictions were very trying, but I was always glad that I persuaded Sir Tennyson D'Eyncourt, with his very great knowledge of ship construction, to continue his valuable work for the landships. I was then able to draft the following minute, on the 13th April, 1915, and send it to Commander Boothby—

With regard to the provision of Pedrail machines, I am arranging with the Director of Naval Construction for him to continue to run the work of the Committee.

Major Hetherington should be instructed to keep you fully acquainted with all decisions of the Committee, and you should attend meetings when convenient.¹

Eventually, the tanks arrived at the front, and on 15th September, 1916, they were used in action for the first time in history, in the great Battle of the Somme, officially known as the Battle of Flers-Coucelette, in which High Wood and Flers were taken. The tank crews handled their new weapons with great gallantry.

On the 30th September, 1916, the Director of Naval Construction and Colonel Stern² called on me in my Admiralty office to tell me about the success of the tanks when first used on active service. Colonel Stern said I was quite right in telling them at the first trial at Hatfield Park that 3,000 should be ordered, and now a great number were on order. Sir Tennyson D'Eyncourt was delighted with the success of the tanks, which he said had passed all his expectations. Colonel Stern informed me that General Haig had said that the advance was impossible without tanks, and the taking of the villages, etc., during the big push was largely due to the tanks, and their crews had behaved most gallantly. (Plate 47.)

From the very earliest conception of the tanks, Colonel Stern had the greatest faith in these machines, and pressed them for

¹ A.C. 10976.

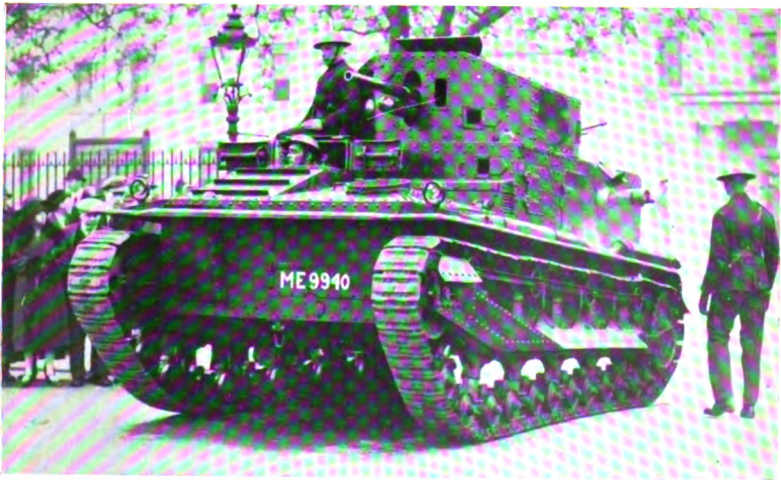
² Now Lieut.-Colonel Sir Albert Stern, K.B.E., C.M.G.

PLATE 47



"THE RHOMBOIDAL" TANK

Designed and constructed by Mr. Tritton, of Messrs. Foster & Co., and Lieutenant Wilson, attached to R.N.A.S., Hatfield Park, January, 1916



A BRITISH TANK

Taken during the General Strike, May, 1926

(This design has reverted more to the Naval Airmen's Caterpillar landship than the Rhomboidal type above)

all he was worth. This support from a sound business man, with no axe to grind, was worth its weight in gold for tank development.

It was no doubt natural for many claimants to come forward after the War as the sole inventors of the tank. Many sought to reap where they had not sown. But, fortunately, I kept a copy of every paper, every minute, every photograph, and these show the part the naval airmen played in evolving a quite novel type of weapon for use by our Army in the Great War.

In September, 1916, on reading one of our London journals, I felt it my duty to my air officers to put forward the following memorandum to the Board of Admiralty, although it repeats in some respects what I have previously said. It is a concise statement of the case, and as the tank has become an historic weapon, it would be as well that the history of its evolution, with the official papers, be recorded, and available to those who study the evolution of new weapons and new methods of warfare—

HISTORY OF ARMoured CARS, JUGGERNAUTS, LAND BATTLESHIPS, TANKS

With reference to a leading article in the *Daily Mail* of the 18th¹ instant (copy attached) and to other reports in the Press on the invention of the armoured cars now being used at the Front, I submit that in justice to those who really conceived the idea, I may be permitted to place on record the history of their inception.

When instructions were received by the Air Department from the First Lord that the R.N.A.S.² was to establish an aeroplane base at Dunkirk and temporary bases as far inland as possible, it became necessary to develop an armoured car support to rescue aeroplanes which had to make forced landings in territory which at that time was overrun by bands of Uhlans (*vide* Air Department reports on 1st September to 31st October, 1914, copy attached).

As a first start Commander Samson was instructed to obtain some ordinary steel plating from the firm of Chautuers de France, Dunkirk, and bolt it to the bodies and in front of the radiator, etc., to form some slight protection.

This plating was found, unless the thickness and weight were

¹ 18th September, 1916. ² Royal Naval Air Service.

excessive, not to be of much real protection, so a form of wagon was produced, mounted on a touring chassis and covered with flat armour plating, which, after a series of experiments, was obtained .3 in. thick and which would resist the German bullets at point blank range.

At this point the War Office were asked if they possessed any details of the necessary thickness of armour plating to resist rifle fire at short range and were found to possess no information either with regard to this or to the penetrative qualities of various rifle bullets. Nor did they appear to have any information of what was considered desirable in an armoured car. From this point the War Office were not consulted in any way regarding the design.

These cars had to be made in such a form that protection could only be given with flat plates, since at this time the art of bending these plates had not been acquired, and was only later attained as a result of further experiments.

On returning from Antwerp the evening before its fall, and having seen the work of the armoured cars in the villages between Antwerp and Dunkirk, I became convinced that both Lord Wimborne and myself were on the wrong lines with armoured cars. Our cars suffered from the lack of overhead protection¹ and the crew were open to fire from snipers at the upper windows of houses and in the arms of trees.

After discussing several possible forms of cars with Lord Wimborne, Squadron-Commander W. Briggs, and Squadron-Commander T. Hetherington, a revolving turret, completely covered, was decided to be the only real solution, and accordingly a model car was made on these lines in three-ply wood.

The weights were carefully worked out, and it was found possible to carry them on either a standard Rolls-Royce or Lanchester chassis. The work of making this car in armour plate then commenced and after a certain amount of experimental work these cars were satisfactorily produced, and subsequently a large number of squadrons were fitted out, which have given uniformly good service wherever employed under conditions at all suitable for their use. At the same time, it was realized that such cars carrying only machine guns required to be backed by some heavier weapon, and the question was approached of providing a motor lorry which could carry a three-pounder or even a twelve-pounder and the Vickers 1 in. Pom-Pom. Lorries were accordingly built protected by shields and armour plate to resist machine-gun fire.

¹ Captain Arthur Nickerson, a military officer attached to the R.N.A.S. Armoured Cars, was the first to impress upon me the need for overhead protection for these cars from his experience in the South African War with snipers, etc.

These were none too satisfactory, as the three-pounder was not well protected, and the weight was almost too much for the wheels, although it may be added that these three-pounder lorries did useful work with the Army around Ypres.

About this time Squadron-Commander Hetherington brought to me an idea for mounting a twelve-pounder gun on a large land battleship running on wheels, and I subsequently discussed this idea with Squadron-Commander Briggs, instructing him to go into the matter in conjunction with Mr. Booth, the technical adviser to the Air Department, and to obtain all the information available regarding agricultural tractors and similar forms of machinery.

Finally, it was found possible roughly to design a land battleship which was protected as regards its vital parts by approximately 4 in. armour, and which mounted six 4 in. guns. It was considered that such a vehicle would traverse practically any country at a speed of about 4 miles an hour, and that it would be invulnerable to rifle and machine-gun fire, and also to that of ordinary field guns. Of course, heavy artillery would wreck it with a direct hit.

Several schemes were worked out, and eventually Squadron-Commander Hetherington, Squadron-Commander Briggs, and myself drew up a paper for the First Lord, proposing to build land battleships. The First Lord approved of the scheme and invited the First Sea Lord, Lord Fisher, to look into the matter. The First Sea Lord agreed and asked Sir Percy Scott also to go into the question.

The first R.N.A.S. design was to be a land battleship with the following rough data—

Armament	3 twin 4 in. turrets with 300 rounds per gun.
Horse-power	800, with 24 hours' fuel or more if desired.
Total weight	300 tons.
Armour	3 in.
Diameter of wheels	40 ft.
Tread of main wheels	13 ft. 4 in.
Overall length	100 ft.
Height	46 ft.
Top speed	8 m.p.h. on good roads.
" "	4 m.p.h. on bad roads.

After discussion at a conference, Sir Percy Scott dissented from the idea of land battleships on the ground that heavy artillery would probably wreck them before they could be brought into use.

It was agreed that the original design afforded too large a target, and attention was then turned to reducing the diameter of the wheels.

At this point it occurred to me that we should abolish wheels and try some form of Pedrail system. Acting on this idea, particulars were obtained of caterpillars as used in the United States. Catalogues were collected and Squadron-Commander Hetherington was instructed to visit the Pedrail Company at Fulham, and obtain the loan of Mr. Diplock's Pedrail, and a demonstration was subsequently arranged before Mr. Churchill on the Horse Guards Parade.

The Air Department obtained more data from America and discussed various systems and designs. Squadron-Commander Hetherington obtained a small caterpillar (Killen-Strait¹) and demonstrations were given in forcing wire entanglements, surmounting obstacles, etc., before Mr. Lloyd George, Mr. Churchill, and various officials from the War Office.

I suggested to Mr. Churchill that the D.N.C. should be invited to assist us with the proposal. Mr. Churchill then instructed the D.N.C. and myself to build and organize a force of eighteen land battleships.

I had a private conversation with Mr. D'Eyncourt, the D.N.C., and for reasons irrelevant to the subject asked him to take over the work.

He readily agreed, our models were turned over to him and a committee was appointed consisting of—

The Director of Naval Construction.

Colonel Crompton, C.B.

Colonel Dumbell.

Squadron-Commander Hetherington.

Mr. Dale-Bussell (of Contract Department).

The organization of personnel was commenced by Wing-Commander F. L. M. Boothby and Squadron-Commander Hetherington, and as a preliminary measure a landship squadron was formed under Squadron-Commander Hetherington, it being known as No. 20 Squadron of the Armoured Car Force.

Various experiments were tried with caterpillars bought in America, much useful information gained, and the original designs modified owing to the results of these experiments.

It may perhaps be remembered that the papers dealing with this subject were known as the "Juggernaut"² papers.

It will thus be seen that the Air Service was responsible for—

¹ This machine was procured on the advice of Colonel Crompton.

² Called juggernaut for secrecy purposes.

1. Producing the idea of the so-called "tanks" or "land battleships";
2. Demonstrating their possibilities;

after which the First Lord approved the building of eighteen of these "land battleships."

The Third Sea Lord¹ inspected the Armoured Car Force at Wormwood Scrubs, invented a shield which was tried against other types, and encouraged the Air Department to use armour.

This encouragement had much to do with the determination to produce a "land battleship."

Satisfactory trials were carried out in Hatfield Park in the presence of several Cabinet Ministers and the naval and military authorities. The machine was accepted and the whole project handed over by the Admiralty to the War Office. It was at these trials it was suggested to General Sir Scott Moncrieff, Sir Maurice Hankey, and other Army officers that orders should be placed for a large number of machines.

In view of the large amount of pioneer work carried out by officers of the R.N.A.S., there is a feeling of disappointment that so much credit should have been taken by the military authorities without any being given to the Admiralty for starting and evolving the scheme of "land battleships" which has proved of value to the State.

This submission is naturally only intended briefly to recapitulate for their Lordships' information the history of the machines in question up to the time when the Director of Naval Construction took them over, and to bring to their Lordships' notice the names of the officers primarily responsible for the idea and its evolution.

Acting-Wing-Commander W. Briggs and Squadron-Commander T. G. Hetherington are the two officers concerned.

A series of photographs, showing the first experiments and gradually leading up to what is now known as the "tank," is attached.

(Sgd.) MURRAY F. SUETER.

20th September, 1916.

On reading my memorandum, the Third Sea Lord, Admiral Sir Frederick Tudor-Tudor, sent me by hand the following minute, dated 29th September, 1916, with a verbal message by Admiral Vaughan-Lee, that he would see justice done to the air officers—

¹ Admiral Sir Frederick Tudor-Tudor, K.C.B., a very able scientific gunnery officer and most capable Controller of the Navy.

S.A.C.¹ (COMMODORE SUETER).

I shall be glad if you will furnish me with a copy of your "History of the Tanks" for retention.

Your account exactly fits on to that of D.N.C. without overlapping or contradiction.

I have always realized that the conception and initiation of the idea was due to the R.N.A.S., and that you carried out the early pioneer work.

(Initialed) F. C. T.-T.

(ADMIRAL SIR FREDERICK TUDOR-TUDOR)

29th September, 1916.

(Third Sea Lord).

I extract the following from Squadron-Commander Hetherington's evidence before the Royal Commission on Awards to Inventors, as I want to make it quite clear that a naval airman was the first to obtain the caterpillar machine for Mr. Churchill to see on the Horse Guards Parade, and that he gave to him the first practical demonstration in the War of how caterpillar tracks could be fitted to our turret armoured cars—

1802. Chairman to Major Hetherington: "You were sent by Commodore Sueter to see the Diplock Pedrail?"—"Yes."

1803. "And you reported on it to him?"—"Yes, I think it had to do with these shields. I was sent down to simply look at it and I did not know what it was for."

1804. Mr. Gordon: "You knew about this Pedrail?"—"Yes, I made a report to Commodore Sueter, which satisfied him it was all right."²

In addition to this evidence, I have Squadron-Commander Hetherington's letter, dated 29th May, 1919, from which I extract the following: "The caterpillar truck was introduced by yourself (Commodore Sueter), and not Lord Tollemache."

Also, in his letter dated 8th December, 1918, to me, Colonel Crompton writes: "I know you saw the Diplock before the date I joined the Admiralty Committee."

From time to time considerable feeling was being aroused by various people claiming the sole invention of the tank.

¹ The Air Department had then been reorganized, and I had been appointed Superintendent of Aircraft Construction.

² Fourth day hearing, "Claim in respect of Tank Inventions," page 100, 10th October, 1919.

This even annoyed Mrs. Hetherington, the mother of my gallant driver of the first caterpillar machines, for she sent a strong letter of protest to my wife, as can be seen by its perusal—

BERECHURCH HALL,
COLCHESTER.

MY DEAR MRS. SUETER,

Thursday.¹

Don't you think your husband should really take a very firm and determined stand about the naval part of the tank business?—I know lots of people who think so and there is much feeling. If he does not, the ground will be cut from under the feet of the Admiralty lot.

Mr. Churchill knows the truth; can't he see him about it? I really think he is very unwise if he does not.

Wing-Commander Longcroft and Colonel Maitland have just written me *very strong* letters on the subject, as they both know the whole thing from the beginning and think Tommy is being purposely ignored because he is a soldier attached to the Navy.

Of course, nothing can be done while he remains in the service by his civilian friends, but as it must all come out some day, it seems a thousand pities time is being wasted. Don't you yourself think so?

Are you still hard packing up garments?²

Yours very sincerely,

(Sgd.) F. A. HETHERINGTON.

Also, when serving in Southern Italy, in command of the Royal Naval Air units, I again made a protest to the Admiralty in connection with tank claims, and Commodore Heneage, in forwarding my submission, did so with this covering minute, dated 23rd September, 1917—

Submitted.

I have read with much interest Commodore Sueter's paper dealing with the origin of "The Tanks"; as these machines have now become historic, his request that the officers who pioneered the idea should receive recognition appears to me fair and reasonable.

(Sgd.) A. W. HENEAGE,
Commodore, First Class,
Senior Naval Officer,
Taranto,
Southern Italy.

¹ Undated.

² For the Royal Naval Air Service Comforts Fund that Mrs. Sueter was running.

And the Admiralty, in reply, sent to Commodore Heneage the following letter, which they have now given me permission to make public—

C. Sec. 043/17/6608.

CONFIDENTIAL.

8th November, 1917.

THE COMMODORE COMMANDING
BRITISH ADRIATIC FORCE.

With reference to your submission of the 23rd September last, No. 91/84, enclosing a report by Commodore Murray F. Sueter, C.B., R.N., on the subject of the origin of tanks, I am to acquaint you, for Commodore Sueter's information, that they are advised that the tank and its various features are not patentable, and that it would not appear that any useful purpose could now be served by the establishment of a special tribunal to adjudicate on the relative validity of claims which have been made to the discovery of the idea of the tank and its development as a fighting machine.

Their Lordships desire me to take this opportunity of stating that, in their judgment, the idea of the tank was the outcome of the suggestions and proposals put forward by Commodore Sueter and by the two officers, Wing-Commander W. Briggs and Squadron-Commander T. G. Hetherington, who were associated with him in this matter; and that whatever recognition may be due to those who were responsible for the development and improvement of the idea in detail, these three officers are entitled to the credit of having brought the scheme to notice.

By Command of Their Lordships,

(Sgd.) R. R. SCOTT.

As I have pointed out, I placed all the information I had collected before Colonel Crompton firstly, and afterwards Sir Tennyson D'Eyncourt, and in a minute the latter wrote, when I challenged the question of patents—

If therefore it is desired to recognize the preliminary proposals made by Commodore Sueter and the other officers of the Air Service, it is hardly seen how this could be done by adding their names to the patent specification of a machine with the actual production of which they did not deal. *The mention of their names in Parliament appears to recognize the pioneer work which they actually did, and the*

patenting of the actual machine in detail appears to be entirely another consideration.¹

The extract referred to by Sir Tennyson D'Eyncourt is a reply to Captain Burgoyne (U.), North Kensington, in the House of Commons on the 18th October, 1916, in which Mr. Macnamara (Secretary to the Admiralty) said—

There was no doubt that the idea of employing armoured cars for trench warfare occurred independently to several people. All the Admiralty could do was to take what appeared in Admiralty official records. According to them the idea was suggested to officers of the Royal Naval Air Service by their experience of the naval armoured cars in Flanders in the early days of the War. After various experiments by officers of the Royal Naval Air Service, Mr. Churchill (then First Lord of the Admiralty) instructed Mr. D'Eyncourt, the Director of Naval Construction, to undertake the design of a "tank" or landship, capable of carrying out certain definite operations. The officers of the Air Department of the Admiralty primarily concerned were Commodore Sueter, Wing-Commander W. Briggs, and Squadron-Commander T. G. Hetherington, while the principal credit for the design of the "tanks" rests with Mr. D'Eyncourt.

In September, 1916, Colonel Repington reminds us of a conversation he had with Winston Churchill in these words—

We had a great discussion about the famous tanks which made their first appearance in the field in last Friday's battle. Winston said that though he had in his mind H. G. Wells's predictions about them, they really developed from the armoured motor-car which trench warfare had rendered useless. They were taken up by the Admiralty. He found he had some money to spare and he applied it to this purpose.

To that extent the initiation and responsibility rested with him.

There is no doubt that Mr. Wells will go down to posterity as the "Godfather" of tanks. His predictions given in the *Strand Magazine*, many years before the War, showed that this able author has tremendous foresight, and I pay tribute to his good vision. Also Mr. Churchill should receive the gratitude

¹ This minute appears on official paper C.P. Patents, No. 4623/1917, of 9th November, 1916.

of all for making his air officers pursue new lines of thought and backing them in carrying out new ideas, not only with tanks but with all sorts of aircraft, to a successful conclusion.

The whole question of who was responsible for inventing the tanks was gone into by the Royal Commissioners on Awards to Inventors, and they elucidated that Colonel Swinton, R.E., had placed before the Army authority a scheme for building caterpillar machines, but it was turned down on the Army side of Whitehall by General Sir Scott-Moncrieff's Committee, as is shown from the minutes of proceedings dated 7th October, 1919, before the Royal Commission on Awards to Inventors, page 3, in which the Attorney-General remarked—

On the 13th January the Committee (General Sir Scott-Moncrieff's) inspected two Holt caterpillar tractors at Aldershot and it was thereupon arranged that a trial course of trenches, barbed wire, and obstacles should be prepared at Shoeburyness. That plan was carried out and a Holt tractor dragging a truck weight of 5,000 lb. was tried over that track on the 17th February, 1915.

The result of that preliminary trial was not such as to satisfy the War Office Committee that the scheme was practicable and the Members of the Committee, being unable to suggest any engineer competent to work out a fresh design, that project appears to have been abandoned on the 26th February (1915).

Colonel Swinton is undoubtedly the Army tank pioneer, and should receive every possible credit for that. It was mighty hard luck on him to see his ideas carried to success by the naval airmen and Mr. Tritton. But Colonel Swinton, to his everlasting credit, instead of being jealous, as he reasonably might have been, swung round and supported tank development with all his might. I admired him immensely for this action. It was in accordance with the very best traditions of an officer of that distinguished corps—the Royal Engineers. The initial successes with tanks on active service were due in a large measure to Colonel Swinton's great ability,¹ initiative, and determination to make this new weapon a success.

In this chapter I only want, for my argument, to combat

¹ Now Major-General Sir Ernest Swinton, K.B.E., R.E.

Mr. Pollen's assertion that the airmen's contribution to victory is hard to find, so I will confine the finding of the Royal Commission on Awards to Inventors to Mr. Churchill and the naval air officers who helped him with their contributions to the evolution of the tank, and publish the whole finding in Appendix I, page 425.

The Commissioners, after examining the claims, embodied their recommendations in a single document, from which I extract the following¹—

In the first place, the Commissioners desire to record their view that it was primarily due to the receptivity, courage, and driving force of the Right Hon. Winston Spencer Churchill that the general idea of the uses of such an instrument of warfare as the tank was converted into a practical shape. Mr. Winston Churchill has very properly taken the view that all his thought and time belonged to the State and that he was not entitled to make any claim for an award, even had he wished to do so. But it seems proper that the above view should be recorded by way of tribute to Mr. Winston Churchill.

COMMODORE SUETER'S CLAIM

This officer contributed in a definite degree to the evolution and adoption of the tanks. He appreciated at an early date and urged on Mr. Winston Churchill the importance of caterpillar traction for attack across country; he organized the Diplock trials in February, 1915, and he was the main cause of the appointment of the D.N.C. Committee in the same month.

We think that his services were of great value. But on the other hand, he was acting throughout within the scope of the duties assigned to him and no specific invention of great merit is attributable to him.

We consider that the case of this distinguished officer falls within the general rule to which we have given effect on previous occasions, that (unless in quite exceptional circumstances) no award should be made to a Servant of the Crown for the efficient discharge of duties definitely assigned to him.

CLAIMS OF COLONEL BOOTHBY AND MAJOR HETHERINGTON

In each of these cases we consider that valuable services were rendered within the scope of the employment of the officer and there was not any exceptional invention or discovery as might possibly

¹ Dated 17th November, 1919.

justify an award, even under these circumstances, we are unable to recommend an award to either claimant.

CLAIMS OF MR. MACFIE AND MR. NESFIELD

These are separate claims but we deal with them together because they are in effect rival claims to the merit attaching to the conception, embodiment, and communication of the same set of ideas. These ideas were of considerable value, but on careful review of the evidence there is no conclusive proof that they were brought to the notice of or communicated either directly or indirectly to the actual designers of the tank, so as necessarily to form a link in the chain of causation resulting in the evolution of the tank. In view, however, of the general similarity of these ideas as evidenced by Mr. Nesfield's provisional specification with those embodied in the tank, we have given these claimants the benefit of the doubt and credited them with some share in the evolution of the weapon, and we estimate the value of this share at £1,000. As between the two claimants, we think the credit should be divided equally, and accordingly we recommend the award to each of them of a sum of £500.

As all these officers, with the exception of Mr. Nesfield, were working under my personal direction of the naval airmen at the Admiralty, I think I have made out my case that naval airmen conducted these preliminary caterpillar experiments that led to the first caterpillar landship constructed in the War, which was afterwards perfected into the successful tank by Sir William Tritton.

And as the Royal Commissioners pointed out, Mr. Churchill was responsible for the driving force that the War Office lacked in making his airmen study mechanical weapons for defeating "No Man's Land." The Noahs disliked tanks intensely (Plate 48), whereas the Kaiser appreciated the value of these weapons (Plate 49), and then indifferently copied them. (Plate 50.)

It would be absurd for me to give any opinion as to whether tanks were of any value in the Great War. I must leave that in abler hands, and merely quote a few opinions.

From page 55 of Sir Douglas Haig's dispatch of 20th July, 1918, I take the following—

Reference has been made more than once in the body of this report to the very valuable work accomplished by tanks and tank



THE "NOAHS'" IMPRESSION OF A "TANK"



A WASTED LIFE

Kaiser (to Count Zeppelin) : " Tell me, Count, why didn't you invent something useful, like the tanks ? "

(Reproduced from "Punch," September 27th, 1916, by permission of the Proprietors.)

personnel in the course of the Somme battle. Throughout the whole of this fighting tanks took part in numerous successful counter-attacks, many of which were instrumental in checking the enemy's progress at critical points. On these occasions tanks have shown that they possess capabilities in defence little, if at all, less than those which they have already proved in attack. In their first encounter with German tanks, officers and men of the Tank Corps displayed with success under conditions new in warfare the same energy and resource which have always characterized their action.

This was indeed high praise from our greatest General, the man who embodied the old fighting spirit of Scotland with the best of British Army tradition. I feel confident Lord Haig's opinion of the value of tanks in his great battles will be handed down with pride to all future officers and men of the Royal Tank Corps.

At the time of the Battle of Amiens, the Prussian Minister of War sent out this message¹—

The superiority of the enemy is principally due to the use of tanks.

Then Colonel Seely, M.P., Deputy Minister of Munitions, addressing a meeting on 31st August, 1918, in the East Midlands, of workmen engaged in the manufacture of tanks, said—

... he spoke the literal truth when he declared that he and hundreds of others with whom he had been in action would certainly have been dead but for the tanks. Now tanks were being provided in thousands and would be instrumental in saving thousands of lives. With the tanks available casualties were relatively small. There was no doubt that on a certain day the tanks saved Amiens.

And that the German soldiers in the early autumn of 1918 *did* fear the tanks, is shown by a paper captured by the Australians, giving the reasons to which the German Staff attributed the defeat of the Second Army.

It reads—

August 8th. Reasons reported by officers detailed by the Higher Command to inquire into the defeat are—

The fact that the troops lost their heads when the tanks suddenly appeared behind them through coming up under cover of an artificial fog.

¹ *Tanks*, by Sir Albert Stern.

To the non-existence of any new pattern obstacles either in front or rear.

Insufficient artillery held with reserve infantry in order to deal with tanks and troops breaking through.

Among the measures ordered are that troops must overcome their dislike to trench digging, and must construct posts and positions designed to support each other. The document adds—

It must be made absolutely impossible for tanks which have broken through to penetrate without meeting obstacles, as far as the headquarters of the staffs. The principle that troops, even if employed, must, if necessary, fight on for days to the last man, and the last cartridge, appears to have been forgotten.

If the tanks are to be fought, the order concludes, it means mobile artillery, trench mortars, anti-tank rifles, and obstacles like blown-up bridges, contact mines, and flooded water-channels.

Also General Von Ardenne, commenting in the *Berliner Tageblatt* on the words of German evening communique of 8th August¹—

So the attack of the English between the Ancre and the Avre, the enemy has forced his way into our position

recalls the impression the tanks made on the German soldiers on 18th July, on the Front at Soissons and Château Thierry, and adds—

Before the soldiers were able to regain their mental balance the fire roller,² which was followed by dense enemy attacking waves, had passed over them. The sequel was the loss of a relatively large number of prisoners and guns. In the fighting on 8th August the beginning of the battle appears to have taken the same course. Losses in ground, guns, and prisoners are painful, especially since the German Army Command has desired in the past, and is especially anxious now, to act on the principle of economizing its forces.³

And a German officer made this interesting statement as to the causes of the German defeat—

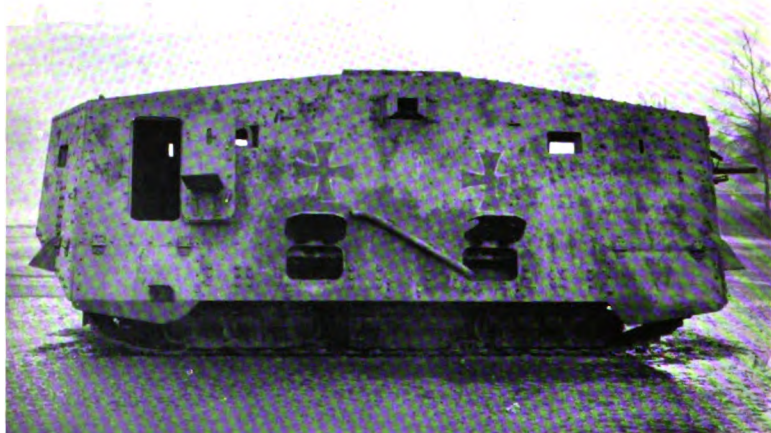
Two great mistakes were made. The first was the complete underrating of the Englishman as a land fighter; the second was the underrating of America both in her capacity to build ships and to raise an army.

¹ 1918.

² Tank.

³ *Morning Post*, 13th August, 1918.

PLATE 50



GERMAN TANKS

The troops in the (German) offensive of 1918 attacked in massed formation. As a result we had enormous losses in the first offensive, 180,000 men. There were not enough troops available, and so the break-through via Amiens to the coast could not be made.

The revolution was not the cause but the result of defeat. With us it came when all confidence in General Headquarters was lost, and especially when the American leaflets (really the British propaganda leaflets) undermined this confidence more and more, and the tanks as a new weapon broke it down altogether.

And, for another German opinion, may I give General Ludendorff's account of the operations around 22nd August, 1918? He says—

During the following days, however, the English, who had but few fresh reserves at their disposal, gained ground towards Bapaume after very severe fighting.

The characteristic of their tactics was narrow but deep penetrations by tank after short but extremely violent artillery preparation, combined with artificial fog.

Mass attacks by tanks and artificial fog remained hereafter our most dangerous enemies.

This danger increased in proportion as the *morale* of our troops deteriorated and as our divisions grew weaker and more exhausted.¹

The British Commander-in-Chief, Sir Douglas Haig, in his dispatch of 21st December, 1918, observes—

Since the opening of our offensive on 8th August tanks have been employed in every battle, and the importance of the part played by them in breaking the resistance of the German infantry can scarcely be exaggerated. The whole scheme of the attack of 8th August was dependent upon tanks, and ever since that date on numberless occasions the success of our infantry has been powerfully assisted or confirmed by their timely arrival. So great has been the effect produced upon the German infantry by the appearance of British tanks that in more than one instance, when for various reasons real tanks were not available in sufficient numbers, valuable results have been obtained by the use of dummy tanks painted on frames of wood and canvas.

It is no disparagement of the courage of our infantry or of the skill and devotion of our artillery, to say that the achievements of those essential arms would have fallen short of the full measure of success achieved by our armies had it not been for the very gallant

¹ *My War Memories*, 1914-18, by General Ludendorff, page 692.

and devoted work of the Tank Corps, under the command of Major-General H. J. Elles.¹

Also it is on record that His Majesty the King sent the following message to Sir Douglas Haig, in November, 1917—

I congratulate you, General Byng, and the troops concerned on the successful operations in the neighbourhood of Cambrai. The complete surprise effected under such novel methods of warfare has been received with the utmost satisfaction throughout the Empire while holding out great hopes for the future. It is especially gratifying that the tanks, a purely British invention, should have played so important a part in your victory.

In perusing my few remarks on tanks, and looking at the photographs of Royal Naval Air Service officers carrying out the necessary preliminary experiments with caterpillar machines, it is of interest to record, and I know it will not surprise the reader, that the Noahs of Whitehall have taken good care that, being airmen, neither the naval air officers who helped me most, Colonel Crompton, nor myself, have received the small courtesy of a "thank you" from the Admiralty or War Office for initiating the caterpillar landship that was brought to perfection by those remarkable engineers, Sir William Tritton and Major Wilson, and of which General Ludendorff² stated: "Mass attacks by tanks and artificial fog remained hereafter our most dangerous enemies."

In common fairness to my airmen, would this omission to thank us (it is all we ever asked for) have occurred in any other branch of the Service? Being merely airmen, we smile. It is interesting, also, to note, as can be seen by Plate 47, that modern tanks have reverted to the lines of the naval airmen's caterpillar landship rather than Sir William Tritton's rhomboidal type.

Some people are over-enthusiastic about tanks, and say that the infantry soldier will disappear. That is not my opinion. The axiom of Napoleon's General, Morand, that "*L'infanterie c'est l'armée*" is as true to-day as in the Napoleonic Wars.

¹ Extract from Sir Douglas Haig's dispatch dated 21st December, 1918.

² Page 217.

All that will happen is that the Army Council will, by degrees, mechanize some of the line regiments and most of the cavalry. Tanks and aircraft have come to stay and they will revolutionize the whole Army as we have hitherto known it.

Tanks, when properly handled, can go almost anywhere—over ditches, rivers, hills and hedges. They will take the place of horses, and the picturesque cavalryman will be kept for very special service.

In the next few years the naval airman who pioneered the caterpillar landship that was developed into the tank will see a tremendous application of mechanical labour-saving machines adapted for the Army. We shall, in short, have a mechanized expeditionary force, vastly different from the 1914 days. I think most military experts will agree with me in saying that the employment of tanks can reduce the number of infantrymen that had to be formerly employed and risked. The crew of a tank are well protected, the machine has a high rate of mobility for attack, and in defence it is equally efficient. To work in one is no more arduous than in a submarine. The conditions are probably better, and what the sailor can do in a confined under-water vessel, the soldier can do equally well in a confined landship. Infantrymen will always be required to press home the attack after the tank has completed its task of pulverizing the enemy's position.

From the economical point of view, I should imagine the complete mechanization of the expeditionary force would, in the long run, save money by the reduction of man-power.

On the 26th July last, I asked the Secretary of State for War whether he could give me the number of officers and men now serving in the Tank Corps.¹ Sir Laming Worthington-Evans kindly replied that the regimental establishment of the Royal Tank Corps was 181 officers and 3,109 other ranks.

I frankly admit that our work in evolving a novel weapon for trench warfare for the Army was quite outside our legitimate air work. Strictly speaking, we were mis-employed. But to

¹ *Hansard*, Tuesday, 26th July, 1927.

have our caterpillar landship taken up by the British Army, then used with some considerable success in the Great War, and have seven million pounds expended upon them, and finally to blossom into the Royal Tank Corps, and be the chief stepping stone towards the mechanization of our fine Army, is an achievement Boothby, Briggs, Hetherington, Macfie and myself can be mighty proud of, and even if the Noahs have deprived us of a common or garden and inexpensive "Thank you," no amount of Whitehall intrigues can deprive us of this success. (Plates 48 and 49.)

One often wonders what the thousands of Army men, who General Seely¹ considers owe their lives to the introduction of the tanks, would say if they knew the naval airmen who were responsible for introducing this novel weapon into the British Army were denied by the intrigues of the Noahs even a formal letter of appreciation for their enterprise and foresight. Also many nations of the world, such as France, America, Italy, and Japan have adopted tanks (Plates 51, 52, and 53) without the slightest acknowledgment to those who pioneered this machine. It is news to me that foreign Governments should take a purely British invention² without a "Thank you." During the Great War this would not have been much trouble, and is all we would have desired.

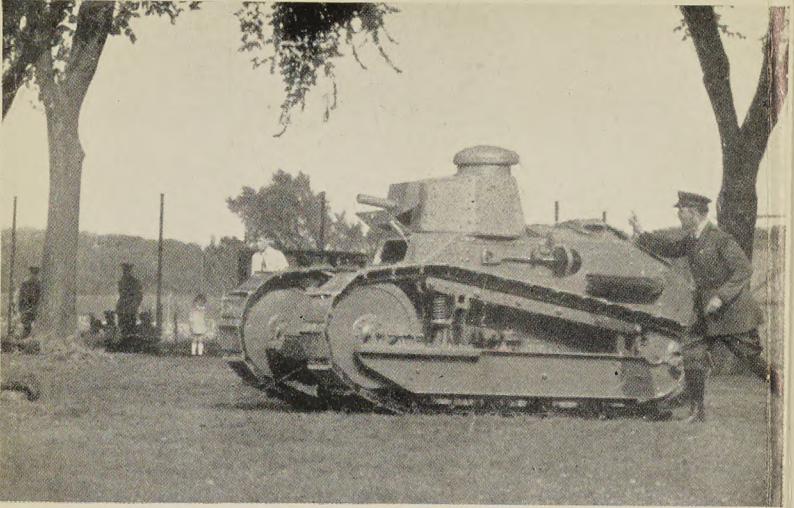
If the naval airmen had been penguins, and had done little airwork, I venture to think that the unbiased reader will readily accord to them a small share of the victory that the documentary and photographic evidence produced in this chapter showed they contributed to, in initiating a weapon unsurpassed in modern warfare, and I may be forgiven in concluding this chapter by asking all airmen to join me in a—smile, as it is sometimes a little "muddy" at the cross roads in Whitehall, and remind them that General von Zwehl wrote,³ "It was not the genius of Marshal Foch that defeated us but General Tank."

¹ See page 215. ² See page 218 for His Majesty the King's opinion.

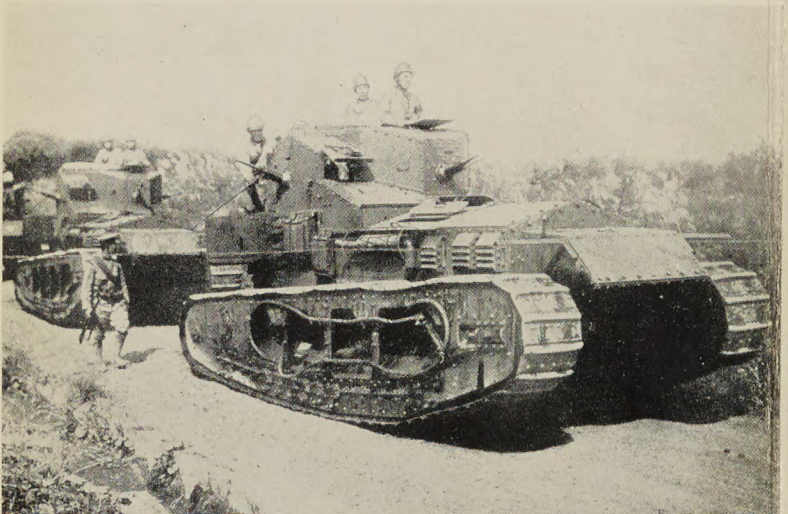
³ From General von Zwehl's book, *Die Schlachten im Sommer, 1918, an der Ost Front.*



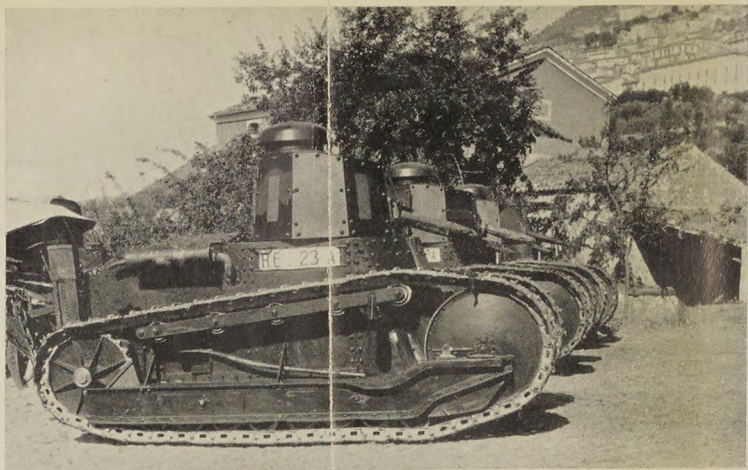
FRENCH TANKS



AMERICAN TANK



JAPANESE TANKS



ITALIAN TANKS

(By courtesy of Colonel A. G. Coppi, Italian Military Attaché)

CHAPTER VIII

THE SEED THAT FELL ON GOOD SOIL AND BLOSSOMED INTO THE ROYAL AIR FORCE

Fitful fires of inspiration
Flickered feebly in the past
Till the sudden flame of reason
Rose triumphantly at last,
Proved itself, compelled acceptance
Of the phantasy of flight,
Stirring throughout all the ages
Dreamers who have dreamed aright.

Set your seal on past endeavour,
Take the future for your care,
For, perchance, the fate of nations
Waits the verdict of the air.
May the God of Battles keep you
Ever worthy of your trust ;
Rally to your new allegiance,
Raise traditions out of dust !¹

In introducing the 1928-9 Air Estimates in the House of Commons, the Air Minister, Sir Samuel Hoare, in an able speech stated² that the—

Creation of an independent Air Force and an independent organization to administer it came about, not as a result of the claims of theorists, but as the result of a most definite demand from public opinion. It was demanded, first of all, for the purpose of avoiding the duplication of organizations, and to ensure unity of command and unity of effort in meeting the menace of air raids in London and in this country. Since then many inquiries have justified and emphasized the wisdom of the decision which was then taken."

¹ "To the Air Force," by the late Squadron-Commander Douglas Hyde-Thomson ; see page xix, footnote.

² *Hansard*, 12th March, 1928, column 1543.

This is only partly true. There were also important under-currents in which certain naval airmen played no small part. Some of these are recorded in my pages to ensure that the future student of air history may be made wise on the difficulties that beset the path of the pioneer in the early days of the air movement.

I frankly admit that our real failing in the Royal Naval Air Service was not so much that the discipline of the young airman was bad, though this was naturally not of such a high standard as that obtained by the naval cadets after the long years of Osborne and Dartmouth training, but it was our over-impatience to push things with the greatest rapidity possible. Most of our pilots were direct entry.

The Navy was full of red tape administration governed by precedent, in which air matters had played no part.

This may or may not be necessary in the older established Services. But to the airman the awful red tape inertia in having to wait often day after day for approval by some higher authority who hadn't the vaguest idea of what he had to approve was like a heavy millstone round his neck. These delays often involved some plain speaking and carefully recorded minutes, which did not in all cases appeal to naval authority.

The airmen had no desire or inclination to discuss precedent or enter controversy. They were full out to play their part in defeating the enemy.

"My Lords" at the Admiralty in those days had a fine opportunity to develop a great air service in the closest co-operation with the Navy. But, to use a nautical expression, "they missed the boat," and after Mr. Churchill ceased to be First Lord, certain Sea Lords commenced to smother the young "air child," which they had been powerless to do whilst he was in office.

They seemed to me to think that an aeroplane, because it was largely composed of fabric, had some connection with the voyage of Joseph of Arimathea to Britain on the miraculous

shirt of his son, Josephus,¹ and was scarcely likely to develop into anything of practical value.

These Noahs knew all about tides and tidal waters, but they had forgotten the story of Canute. They could not see that it was impossible to block the tide of air development. All they could do was to check it during the period that they were in control of Admiralty administration.

Frictions of war have their limitations, and when the interests of the State are concerned, as occurred when open hostility was shown by the Noahs to their airmen, it is the duty of an officer to consider most carefully, from all angles, the difficult position in which he finds himself.

He has to choose between the State and his own Service. If he finds his Service not desirous of continuing certain developments, the question arises : Should he agree with his Service, knowing full well such a course is against the interests of the State ?

I submit when any officer finds himself in this awkward position, that he is no man if he agrees with his Service against the interests of the State, as it seems to me he then places personal considerations first and is thinking more of himself than of what is for the ultimate public good.

In my view, an officer should subordinate personal considerations and strike a line for what he considers the best interests of the State.

When such a case unfortunately arises, as it did with the naval airmen, action, though distasteful, had to be taken by those chiefly concerned. It is very easy to go along the line of least resistance, but not so easy to take the other course.

Nevertheless, in my opinion, it is an officer's duty to detach himself from personal consequences and give the best advice he can in these difficult circumstances.

Thus it came about that some naval airmen were forced to take decisions of far-reaching importance. Consequently, when the Sea Lords started to throw overboard their own "air

¹ The legend of Joseph of Arimathea.

child," whom they had subjected for some time to severe pin-pricking, and then a smothering and disintegrating process, the airmen, who were diplomatic to a degree, merely smiled, as they knew the seed of a separate Air Service, with a separate Air Ministry outside all Admiralty interference or control, was well and truly sown.

In the House of Commons on 20th July, 1915, during the discussion on a vote of credit, Mr. Joynson-Hicks,¹ in a speech on the Air Services, suggested that the Government should appoint "some man of imagination and power," a business man, to advise the War Office and Admiralty as to the best method of creating a really efficient Air Service. During the debate, Mr. Lynch made the following remarks in his speech—

I would like to refer to one point made by the honourable and learned member for Brentford in regard to what he said about a separate department for aeroplanes and particularly a Ministry of Aeroplanes. I am inclined to think that this has almost become a necessity because there is a very great difference in the way in which any particular subject is tackled: if, on the other hand, it is left to a sub-department of a great office it is not so efficiently dealt with as if it be left to an entirely new department fitted with new energy and possessing great offices of State. They generally have the faculty of magnifying the importance of their own office.

That would be a distinct advantage because once this work is undertaken it ought to be pressed forward with the greatest energy and vigour, so that in the shortest possible space of time this country and its allies would in this respect be in a position of enormous advantage, and I would emphasize the fact that this suggestion points out not only a way to victory, but almost the only way which is now open to us.

I recall a significant article that appeared in the *Globe* newspaper some little time after the Sea Lords then in office had commenced their smothering policy against (to their everlasting shame !) their own Air Service.

It was written by the late Mr. Charles Palmer, then editor

¹ Now Sir William Joynson-Hicks, Home Secretary.

of that paper, and afterwards Member of Parliament for the Wrekin division, and contained the following¹—

We kept our land inviolate so long as the sea was the method of approach to our shores. The menace is now from the air. It is a menace that grows more actual every day. Germany leaves and is leaving nothing to chance. We are an island power. To us as a people supremacy of the sea has meant security for this land of ours and the Empire that has sprung from it. That security is now threatened. Let the country grasp that fact, and those who know and understand the danger will be supported in the demand for a Royal Air Service as a separate fighting force, with all that makes such a force complete and efficient alike in civil administration and in naval and military organization.

. . . It is of first importance that the Air Minister should be a strong, independent man carrying the confidence of the nation and Parliament. Would that he could be a man divorced from the ordinary political groups. Is that impossible?

What will be demanded of such a man is ready sympathy with the great work and possibilities of the Royal Air Service, courage to support all who serve under him and independence and strength in the face of the usual crippling political influence.

My reader will readily agree that the present Air Minister, Sir Samuel Hoare, fills this bill to a letter, and this was written thirteen years ago! I wonder who was the naughty naval airman who inspired Charles Palmer? The article went on to say—

Be it noted that by thus bringing the R.N.A.S.² and R.F.C.³ under one Minister and one central control great economy of time and labour would be effected and greater efficiency secured. Take the matter of armaments: the same department would operate for aeroplanes on both sides. All concerned in experimental and constructive work would come under the executive member of the Board.

This would effect a great saving in personnel and would avoid that repetition of experiments which means waste of money.

Such a ministry, conducted with sympathy, courage, and efficiency, is essential if the Air Service is to be recognized and treated as of an importance equal to the other branches of the fighting services.

It will have to be taken in hand in some such thorough and business

¹ *Globe*, of 13th October, 1915. ² Royal Naval Air Service.

³ Royal Flying Corps.

fashion sooner or later. Let it be done now, now, in the midst of a war which may yet find its *dénouement*, if not made in the air, at any rate developed there. This is no time for a "Wait and See" policy. Any man with imagination—and it is imagination that is so sadly lacking in high places—can visualize the future and see what is before us. We have the men anxious and capable, who will fashion and develop our Air Service into a great weapon of defence. Yes, and of offence if they are given the means and the men.

If the Government will not move, then in this, as in so many other matters vital to our safety and our strength, the nation must make them move.

One of the naval airmen who helped so steadfastly in sowing this seed for a separate Air Service, to which he afterwards gave his life, was the late Air-Commodore Groves,¹ a very hard-working officer, fearless airman, fine comrade, with a tremendous faith in the future of the air arm as an independent Air Service. Commander Halahan² was no less enthusiastic. Both these fine workers and clever men appreciated the air story when first unfolded to them, and, possessing vision out of the ordinary, backed it for all they were worth.

Having studied air administration from the day I started naval air work in 1909 with one officer and one man, I am bound to record that some person, perhaps difficult to discern at this distant date, pitted his will against that of the very dear "Sea Lords" who were in office at that time, and who, like "Neon," saw no good in air development. (Plate 53.)

He seemed to me to rescue the "air child" that the Admiralty was strangling. Most wise counsel at this period of strangulation was given to the naval airmen by that very able member of the first War Air Committee and fine pioneer in many directions, Lord Montagu of Beaulieu. He did his utmost to assist the naval airmen by much sound advice, curbing too much haste, etc. He was ably supported by a very capable politician and keen student of air, naval and submarine warfare—Alan Burgoyne.³ Both these able, quick-brained,

¹ Commodore Groves was formerly a commander in the Royal Navy.

² Now Air-Commodore Halahan, C.M.G., C.B.E., D.S.O., M.V.O., R.N.

³ Now Sir Alan Burgoyne, M.P., Member for Aylesbury Division, Bucks.

and fine colleagues cheered the airmen up and gave them fresh hope. (Plate 53.)

After close and earnest consultation with one of the naval airmen, extending over many meetings and viewing air administration from every possible angle, Lord Montagu, in a very able speech in the House of Lords, moved¹: "That this House considers that the development of aviation for purposes of war can no longer be efficiently carried on under the present system of the divided control and responsibility of two separate Departments; and that the time has now arrived when the supply of men and materials should be concentrated under single control, at the same time leaving the executive power over naval and military aircraft with the Army and Navy, as at present," and in his speech, Lord Montagu said—

I am quite aware that I and others like me will have to justify fully our demand for a unified system of administration and for what we want to see set up—namely, an Imperial Air Service . . .

Eventually a fully fledged Air Ministry must come out of this; and when that Ministry comes—and I think it will come much sooner than most people think—it will come owing partly to the efforts of myself and people who think like me.

In winding up the debate, the late Lord Northcliffe,² who took a great interest in airmen and who had always done his very best to advance the science of aeronautics in this country, referring to Lord Curzon's new appointment on the Air Board, said—

But I do not think that our new Air Minister, for such I consider him to be, such, I think, the Germans will make him, could do better service than first to encourage inventors; secondly, to develop manufacture; and, thirdly, to provide far greater training for our flying men.³

¹ *House of Lords Debates*, 23rd May, 1916, Vol. XXII.

² Lord Thomson recently reminded us that nineteen years ago Lord Northcliffe saw Wilbur Wright flying at Le Mans and was at once convinced of the great future of aviation. Thereafter Lord Northcliffe had offered substantial prizes for outstanding exploits in aviation, and the *Daily Mail* had presented in all £50,000 in prizes for aviation.

³ *House of Lords Debates*, 23rd May, 1916, Vol. XXII, column 126.

These were helpful words from a big man of vision to the struggling airmen. After this debate in the House of Lords, Lord Montagu coined a very apt slogan—

"One Element, one Service."

At this time matters became exceedingly difficult for some of the naval airmen carrying out administrative duties. Instances of blocking wireless telegraphy and machines, as revealed in copies of the minutes I have before me, are a positive scandal. At times it was hard to carry out one's legitimate work. But the naval airmen, having great faith, never gave up hope for brighter days, and were always full out to do their utmost for the air. They encouraged Mr. Handley Page to develop his bombing machine under the greatest difficulty. (Plate 54.)

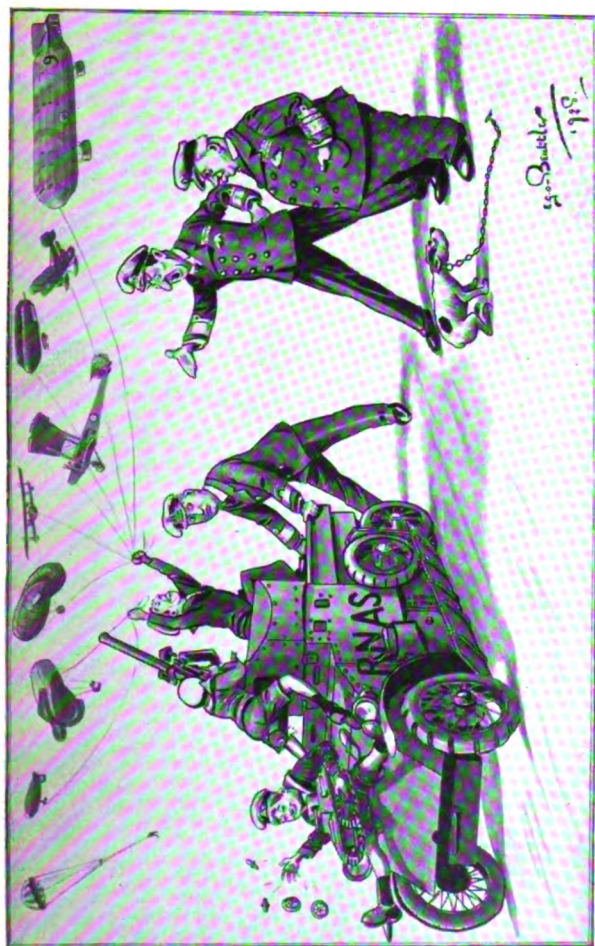
For months and months this type of machine was blocked in its normal development by responsible people at the Admiralty, as a study of the official papers will disclose, and in recording this I have the following amusing incident to relate.

My former Commander-in-Chief, Admiral Lord Charles Beresford, wrote, after some of our air raids into Germany, and congratulated me on the work of the naval wing. Then, in the House of Lords air debates,¹ he suddenly made violent attacks on the Naval Air Service. The Curtis, Sparrow, Handley Page machines, S.S. airships and armoured cars were all condemned quite indiscriminately. Then Lord Charles said of the naval airmen: "All their time was devoted to these armoured motor-cars,² which had nothing to do with the Air Service and nothing whatever to do with the Navy," and only a short time previously he had written his congratulations on our air raids into Germany! I could not imagine why the Admiral did this, but the explanation was soon forthcoming.

A well-known lady, who was working for the Naval Air Service at Roehampton, rang me up on the 'phone and asked me if I had seen the report in the Press of Lord Charles Beresford

¹ *House of Lords Debates*, Vol. XXI, and Vol. XXII, 1916.

² The armoured motor-cars that gave us the first caterpillar landship; see Chapter VII.

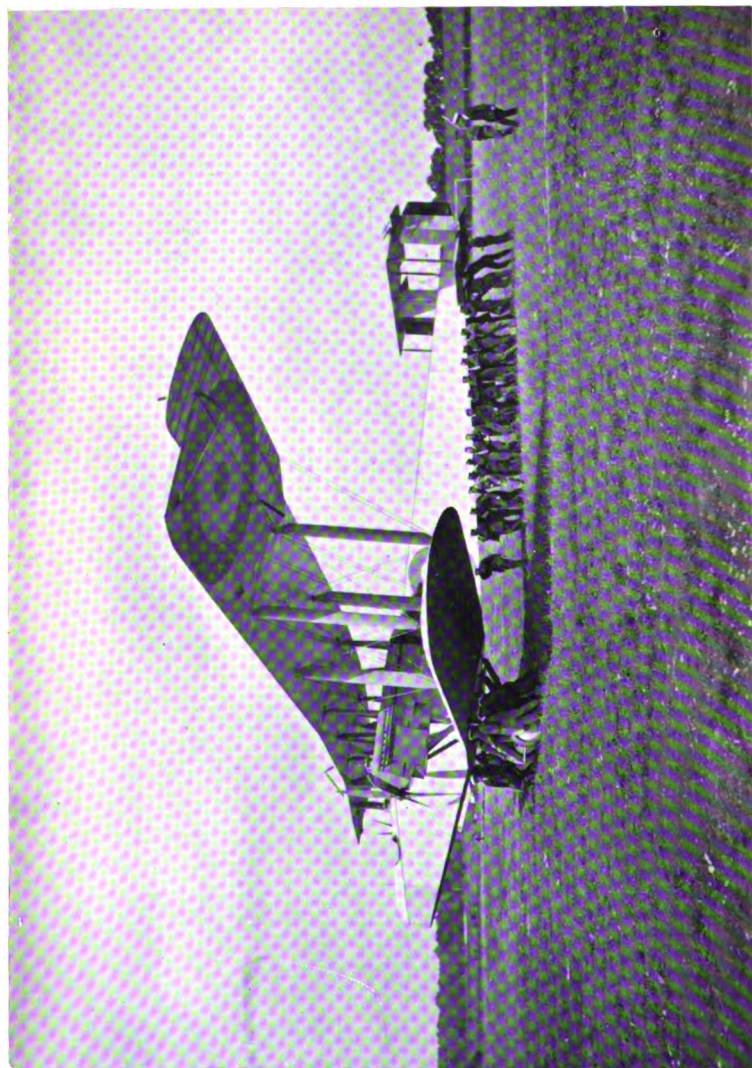


THE REPLY OF THE FIRST DIRECTOR OF ADMIRALTY AIR DEPARTMENT
TO LORD CURZON'S LETTER (PAGE 239)

1st Great Man : We must destroy "IT."

2nd Greater Man : "IT" must be destroyed.

D. A. D. : Winston's had a row with Jacky Fisher and gone off, leaving me a devil of a load. I do wish these great men would give a little help in this new air work, instead of glaring at me. After all, we are at war. They can destroy me. But they are quite powerless to destroy my Air Baby. He is a fine fellow, and knew how to make war from infancy. Perhaps he would thrive better if I pressed, in the interests of all, for a separate Air Ministry and separate Air Service, free from all Admiralty and War Office control. Montagu will lend a hand—none better.



R.N.A.S. MECHANICS BRINGING OUT THE FIRST HANDLEY-PAGE
Pioneer of large machines in this country

attacking in the House of Lords our aeroplanes and armoured cars. I said "Yes." The reply was: "Well, Commodore, I will make you laugh," and she related the following—

I was out at a tea-fight yesterday afternoon and who should walk in but Lady Charles Beresford and she related the following as a good story, knowing I was interested in air work at Roehampton, and I think she wanted it passed on to you.

Lord Charles had a dinner-party a couple of nights ago and Lady Charles didn't attend, as it was a bachelor party. But, said Lady Charles, I sent the butler down to find out what they were talking about and the subject was an attack on the aeroplanes and armoured cars to be delivered in the House of Lords, and who do you think the chief guest was—a Sea Lord of the Admiralty!

On hearing this story, I promptly went out with Admiral Vaughan-Lee to call upon Lord Charles Beresford, as I had known him so well in the Mediterranean, when he used to use my little cruiser, the old *Barham*, as a yacht, to take him to Venice, etc., and I challenged him with this attack in the House of Lords on the aeroplanes and armoured cars, and gave him the name of the Sea Lord, and he wouldn't deny that this peculiar person had told him to attack the aeroplanes and armoured cars. My dear old Chief praised the work of the naval airmen and said he only wanted to have a dig at Winston, who had been responsible for the armoured cars, etc.

But anybody who knew Lady Charles intimately, like so many of us did, will appreciate this yarn, and the way she got it into the proper quarter showed that old friends of Malta days were not forgotten. Many of us were devoted to Lady Charlie, and remembered the amusing lunch and tea parties she used to give in the Admiral's yacht *Surprise*.

Reader, can any person read this aeroplane and armoured car incident, with its extraordinary act of unnecessary hostility to naval airmen, and wonder at them endeavouring with all their might and main to free air development from these silly and petty intrigues, which, in my view, were contemptible?

The naval airmen were out, as these pages show, to do their utmost in many new fields, spread over wide areas, to help

win the War. In their work they had the greatest assistance from those very fine Civil Servants, the former and present Secretaries of the Admiralty, Sir Graham Greene and Sir Oswyn Murray. Many people consider the Admiralty should be run entirely by naval officers. Heaven forbid ! The Civil staff hold the balance between different schools of thought that so often arise in such a Service as the Navy, and right well and loyally they do their duty. Both Sir Graham Greene with Sir Oswyn Murray and many men belonging to their staff believed that the development of the air would be of value to the Navy. They were supported in this view by the Accountant-General, Sir Alfred Eyles, the Director of Contracts, Sir Frederick Black, and the Director of Stores, Sir John Forsey. We had considerable difficulty at first in arranging the rates of pay for the flying men, but no trouble was too great for the Accountant-General and his staff to do all they possibly could in the interests of the airmen and their dependents.

All air work was new ; consequently the Director of Contracts and Director of Stores had some difficulty in following air requirements. The members of their staff that they detailed to assist the Air Department could not have been better. Men like Smallwood, Fisher, Minter, Brotherton, Morris, Weston, and Aitken, with Naef, Croft, Sanger, and many others in the A.G.'s Department, worked like slaves for the air, and received scanty acknowledgment for their really fine work. In addition to the good support we had from these Civil Servants, three First Lords, Mr. Reginald McKenna, Mr. Winston Churchill and Mr. Arthur Balfour, did everything they possibly could to support the naval airmen in their difficult duties.

The opposition to air development at the Admiralty lay almost entirely with certain Sea Lords from 1909 onwards. I was called a damned fool for developing the Handley-Page giant bombing machine. This didn't perturb me, as I considered some of the Sea Lords perfectly priceless for lacking vision and preventing the Fleet they were trying to the best of

their ability to serve so well from having proper aerial reconnaissance, torpedo-dropping machines, and aircraft carriers in the North Sea during the War period. For did not Lord Beatty remark—

The enemy has still the monopoly of the best air scouting in good weather, when one Zeppelin can do as much as five or six cruisers.

Certain Sea Lords failed Lord Jellicoe and the Grand Fleet, not the naval airmen.

When the late Marquis Curzon and Lord Sydenham were appointed by the Government of the day to form an Air Board, the naval airmen were able to lay before them a considered opinion of what was wrong with air administration, and that a separate Air Ministry was necessary for air development.

This view was pressed upon Lord Curzon, the President of the Air Board, whenever opportunity offered.

Commodore Groves manfully backed up every move towards the goal certain airmen had in view. It appears to me, when studying this subject, the one person I have in mind soon convinced Lord Curzon and Lord Sydenham that the Sea Lords were neglecting a great opportunity and were mishandling their Naval Air Service after Mr. Churchill left the Admiralty. Anyhow, Lord Curzon's air advisers seem to have won the great battle with the Noahs of that time, and prevented them from further blocking air development, and I fancy I know an airman who must often laugh up his sleeve at the futile, very futile, efforts made in the House of Commons and outside during the Beatty administration at the Admiralty to break up the Royal Air Force. Surely his laugh must be all the louder when he compares these puny efforts with the stiff fights that went on in 1916-17.

Colonel Repington also records in his most interesting *Reminiscences* that he had an interview with one of the Admiralty airmen, in which the latter stated—

He deplored the departure of Winston,¹ who, he said, kept them all on the move in the Admiralty and compelled them to be

¹ Winston Churchill, who had then ceased to be First Lord of the Admiralty.

constantly at work and on the alert. He and Winston had practically run the Air Service between them : now there was chaos. The young men could not get their way. No one, in his opinion, controlled the Air Service and that was the way we were making war . . . It was impossible to get ideas through the old men . . .

"S" wants an Air Ministry that would control the whole Air Service.

This was 24th May, 1916.

At one of the very last War Cabinet Committee meetings¹ held by Mr. Asquith in Downing Street before he ceased to be Prime Minister, I was summoned to attend, and after many had spoken, Mr. Asquith asked if anybody else had anything to say. Then he gave me permission to speak, and I begged him to lay down a proper air policy and place a statesmanlike Lord Curzon at the head of all air administration to enable us to get on with air development. I told Mr. Asquith the airmen had waited many years for a forward air policy, but up to the present little or nothing had been done. There was dead silence in the Prime Minister's room, the naval Noahs all glared at me, and the meeting broke up.

Outside the Prime Minister's room, Lord Sydenham came up to me and said, "Commodore, they will court martial you for that." So I replied, "I can't help it, sir. My considered view must be expressed ; no matter what the consequences may be to myself."

Having nailed my air colours to the mast, I was prepared for the worst. But that fine old Statesman, Lord Balfour,² as long as he was at the Admiralty, would not let me be strangled by the Noahs, who wanted my blood so badly. Towards the end of 1916 and beginning of 1917 relations between the Admiralty and the Air Board became exceedingly strained. The then First Sea Lord did not see eye to eye with the President of the Air Board. This amused Lord Curzon greatly, and although the Admiralty was largely instrumental in smashing up the Air Board at this time, other influences were at work,

¹ End of 1916.

² Then First Lord of the Admiralty.

and Lord Curzon had placed before him a complete scheme for establishing a separate Air Service and separate Air Ministry, free from all Admiralty and War Office control. This document was very carefully considered, and, without disclosing its contents or letters connected with it, I can say that the Royal Air Force as we now have it is on "all fours" with the proposals then given to Lord Curzon. The Air Ministry came into being early in 1918. Perhaps a few careers were sacrificed in the making. But these are of no consequence when great issues for the good of the State are involved.

Thanks to Lord Balfour, there are no courts martial to record in connection with creating our separate Air Service. This was not the case in America. That fine pilot, Brigadier-General Mitchell, had the same views as were held by a handful of airmen in this country. He tried to shake off the dead-weight administrative shackles of the American Navy and Army, but without success. In his endeavour to create a separate Air Service on the lines of that we have in this country, he spoke out bluntly and plainly to naval authority. For doing so, he was court martialled and brutally thrown out of the United States Military Air Service.

This very unsavoury blot on the administration of their Air Service by the American Government all pioneer airmen must deplore. Brigadier-General Mitchell was merely doing his duty as he saw it and as some airmen saw it in this country. I have the greatest admiration for the courageous conduct of this gallant officer in his battle with the Noahs of the American Navy, and sincere regrets that he sacrificed himself to bring the "Air" of his great country up to date by his bold effort to set up a separate Air Service. May I remind him that he is not singular; others before him have had to do the same, and in now having to stand aside General Mitchell must always remember that it is the rich reward of the pioneer, and always will be, to see others reap where they have not sown. It requires the philosophy of a man like Lord Balfour to do this without a murmur. All the same, it is a good test of human

self-control. General Mitchell will, I feel confident, not take it amiss if I inform him why he failed. It was because he used his military sword as a bludgeon ! If he had only followed the teaching of all great movements he would have learnt that a rapier in skilled hands is the best of all weapons to use against the Noahs.

When I was questioning a statement made in the House of Commons by Commander Carlyon Bellairs during the debate on last year's Naval Estimates,¹ one of the Labour Members, who had read his Sunday *Observer*, in which Mr. Garvin likened "Neon" to Noah, shouted out to me, "Admiral, look at Noah." Everybody laughed.

Now, I have the greatest admiration for Commander Bellairs' great knowledge, may I even say very great knowledge, of old-time naval matters, from the historian's point of view.

When he used to lecture to us, at the Greenwich War College, his capability in mastering intricate naval and trade statistics won the admiration of all of us.

But I will not admit he has the slightest first-hand knowledge of air or submarine matters, as these craft came into being after he left the Service.

I cannot criticize Commander Bellairs' ability to deal with modern naval warfare as ably as Admiral Harper, for I notice in his most interesting Jutland book,² the following passage occurs—

Commander Carlyon Bellairs' book is imbued throughout with a captious and carping spirit. Nothing that Admiral Jellicoe or the Battle Fleet did could be correct in the eyes of this omniscient and self-confident critic. His assertions, often made without any foundation or any evidence to support them, are presumptuous. He even attacked the proposed "Official Record of the Battle of Jutland" while it was still being considered by the Board of Admiralty, and before its contents were available to anyone outside those immediately concerned with its compilation.

That is Admiral Harper's opinion of Commander Bellairs' book.

¹ 1927. ² *The Truth About Jutland*, page 146.

Of late this gallant colleague of mine can see nothing good in the Royal Air Force, and I had cause to challenge a letter of his by the following to the *Morning Post*,¹ which the editor very kindly inserted—

WHY WRECK THE AIR SERVICE ?

SIR,

As I know your many readers are always ready to hear both sides of any question, may I draw their special attention to a letter published in your issue of the 26th, under the signature of my gallant friend and able colleague, Commander Carlyon Bellairs, in which he states "there are two ways out of our difficulties, and the first is—

"To adopt the suggestion put before the Premier by the Committee of Naval M.P.'s, of which I was chairman—the report of which was not given to the Press at the request of the Premier—and amalgamate the Air with either the Navy or the Army, on an equal basis of control, giving to the other Service its own Air arm, and separating civil aviation, as is done with the Mercantile Marine."

Commander Bellairs has omitted to state that Rear-Admiral Sueter, one of the members of the Parliamentary Navy Committee, was the only member who refused to sign this suggestion and requested that his dissent be forwarded to the Prime Minister, which, I understand, was done.

The result was that the suggestion was pigeon-holed, and as two years have nearly elapsed it is, no doubt, well covered with Whitehall cobwebs.

When the Navy had its separate Air Service, which Admiral Sir Reginald Hall has described in the House of Commons as being "most efficient,"² what did the Admiralty do with it? They first smothered the young air child. Then threw it overboard.

I feel confident that the Prime Minister will turn a blind eye to the attempts that are constantly being made in certain quarters to break up our most efficient and well-administered Air Force.

Some of us are getting very tired of the "Noahs" who are responsible for the conception of "Neon" in their annual attempts to wreck the Air Service—a force the majority of our countrymen are becoming vastly proud of.

(Sgd.) MURRAY F. SUETER.

House of Commons.

Commander Bellairs has no right to mislead the public on air matters. If it was not for this hostile "air bee in his bonnet"

¹ *Morning Post*, 29th April, 1927. ² See page 241.

and he would stick to early naval history, or his useful effort to cut down the present unwieldy Cabinet, he would be the very best of picturesque colleagues.

After this meeting of the Parliamentary Naval Committee, in which I protested most strongly at any attempts being made to break up the Royal Air Force, one of my naval colleagues, whose great ability and ingenuity I admire immensely, came up to me in the lobby near where the Whips on the door stand. He was then very angry with me, and said " You old devil, I don't believe you really believe in a separate Air Service. I will bet you anything you like that within two years I will smash up the Air Ministry and we will have the Air Service handed back to the Navy and the Army."

I laughed and said, " Right you are ; I will take on the bet." Visions of former fights with the Noahs floated before my eyes.

On my return from Hendon to-day,¹ that is, almost exactly two years after this bet was made, what do I find ?

I find the Royal Air Force more efficient than ever.

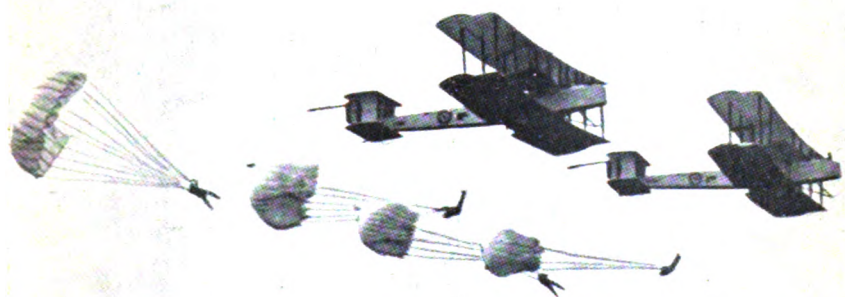
In spite of three days of rain, the young air pilots put up a truly wonderful performance. It was the pilots' day. It was their show, and they demonstrated before Their Majesties the King and Queen, His Majesty the King of Spain, the Duke of York and over 100,000 fellow-countrymen and women their complete mastery of air machines. Whether it was flying with experimental types, crazy flying, formation flying, dropping bombs, destroying a kite balloon, parachute jumps, or other features of an interesting programme, the airmen displayed fine individual skill. Their great audience must have been fascinated. (Plate 55.)

I have never seen any machines—and it was a bad day—carry out formation flying with such accuracy in maintaining their relative positions.

The five instructors² from the Central Flying School showed

¹ 2nd July, 1927.

² *Pilots* : Flight-Lieutenant D. D'A. A. Greig, D.F.C. ; Flying-Officer A. E. Beilby ; Flying-Officer G. H. Stainforth ; Flying-Officer R. L. R. Atcherley ; Flying-Officer H. R. D. Waghorn.



FOUR PARACHUTISTS DROPPED FROM TWO R.A.F. MACHINES
Hendon Pageant, 1927

in their Genet-engined Moths, a most perfect mastery of their machines in looping, upside-down flying, making quick rolls to regain their upright position in normal flying.

Their display was, in my opinion, a really fine performance. Formation-flying upside down can be no easy task, and these instructors are to be warmly congratulated on their expert skill. I feel quite confident the majority of the audience last year at Hendon were mighty proud of their skilled airmen that form the youngest defence force and the great progress of air development in this country. Many machines carried the usual well-known names tacked on to others to show advancement in type.

All-round improvement in design, performance and military efficiency could be noticed.

The pilots showed the most complete mastery of their weapon, and the pleasure they gave thousands who were watching the result of their high training was immense. Our thanks are due to the President, Chairman and Committee¹ for this fine display.

¹ *President:*

Marshal of the Royal Air Force Sir H. M. TRENCHARD, Bart., G.C.B., D.S.O.

Chairman of Committee:

Air-Marshal Sir J. M. SALMOND, K.C.B., C.M.G., C.V.O., D.S.O., A.D.C.

Vice-Chairman of Committee:

Air-Commodore F. V. HOLT, C.M.G., D.S.O.

Chairman of Flying Sub-Committee:

Air-Vice-Marshal Sir H. R. M. BROOKE-POPHAM, K.C.B., C.M.G., D.S.O., A.F.C.

Chairman of Set-Piece Sub-Committee:

Air-Commodore J. G. HEARSON, C.B., C.B.E., D.S.O.

Committee:

Group-Captain A. FLETCHER, C.M.G., C.B.E., M.C.
Group-Captain A. L. GODMAN, C.M.G., D.S.O.
Wing-Commander C. G. SMITH, O.B.E.
Wing-Commander E. H. SPARLING, A.F.C.
Squadron-Leader E. W. GREGORY, M.C.
Flight-Lieutenant D. E. WARD.
Flight-Lieutenant D. D'A. A. GREGG, D.F.C.
Flying-Officer W. E. JOHNS.
C. P. ROBERTSON, Esq.

Group-Captain H. COOPER, D.S.O., B.A.
Wing-Commander R. G. D. SMALL.
Wing-Commander J. S. T. BRADLEY, O.B.E.
Squadron-Leader A. R. C. COOPER
Squadron-Leader F. J. LINNELL, O.B.E.
Flight-Lieutenant C. R. CARR, D.F.C.
Flying-Officer C. DOLLERY, M.B.E.
Flying-Officer A. J. ADAMS.
Captain H. V. SNOOK, M.R.S.I., P.A.S.I., M.I.,
Mun. & County E.

Secretary:

Lieutenant-Colonel A. D. M. BROWNE, D.S.O., O.B.E.

The public who go to Hendon to witness these annual pageants of the Royal Air Force can see for themselves the wonderful precision of the air movements carried out at great speed in the closest of formations, never a second out. They will, I am convinced, agree with me when I say that the pilots of the air now have nothing to learn, and can have nothing to learn, from the sea experts. In these days air work requires a highly-trained expert as much as the sea does. They will admire the wonderful training that has been developed by that really great air pioneer, Sir Hugh Trenchard, now Marshal of the Royal Air Force.

Few who witness these air manoeuvres know the anxious years¹ of patient toil and sacrifice that Sir Hugh has put into his very difficult task. Daily personal contact with all the heads of his staff, quick decision, always creative and helpful when necessary, firmness with justice, easily approachable—these have been great features in his successful regime, and in spite of much hostility from two very well-known quarters, one living to the west and the other the east side of Whitehall, but a little farther afield, Sir Hugh Trenchard's dogged determination has won through. He is the one and only air pioneer that could have achieved such success. Some other of the air pioneers may have had more brilliant brains, but in other respects they would have failed.

Fine work, mighty well done, will be the verdict of his countrymen when he lays down, at, I trust, a most distant date, his life's most successful achievement—the building and moulding of the Royal Air Force.

The author of *The Great Delusion* cannot undermine the successful endeavour of the Air Minister and his able staff to give this country the most efficient Air Service in the world. Sir Samuel Hoare, by his great flights to India, in Palestine, Mesopotamia, Egypt, Baltic, etc., has set a fine example to all Ministers to look into the details of their Departments' responsibilities, and his administrative powers are placed by his

¹ Some ten years now.

colleagues in the House of Commons on the highest plane of Parliamentary achievement.

I should not fail to mention the good work of Lord Rothermere, Lord Weir, and the Right Hon. F. Guest when Air Ministers. Their administration covered a difficult period, but they all showed they were full out to build up an efficient Air Service and help the airmen in every possible way.

Lord Curzon, from the administrator's point of view, investigated the whole position of the naval airmen when the Sea Lords, in their great wisdom, tried to block air development. He appreciated the advice given to him, as the following letter shows—

I CARLTON HOUSE TERRACE.

18th January, 1917.

DEAR COMMODORE SUETER,

I do not quite know what is to be your fate, though I have done my best to save you from the vengeance of those who seek to destroy.

I am sure that quite the worst thing that could befall you would be the knowledge that I had written you this letter, and yet I cannot forbear, now my connection with the Air Board is over, writing you a line to say how much I have respected and admired your courage in difficult circumstances and how greatly the Air Service in my opinion has profited by your initiative, knowledge and ability. Wherever they place you, I wish you well.

Yours sincerely,

(Sgd.) CURZON.¹

Soon after receiving this letter, I was banished to Southern Italy for holding unorthodox views in advocating a separate Air Service, to take up command of the naval air units that had been detailed to try and prevent the Austrian and German submarines playing such havoc with our shipping in the Mediterranean. When at Taranto, I was very glad to receive the following letter from Lieutenant-Colonel Alan Burgoyne²—

¹ The late Marquis Curzon, Secretary of State for Foreign Affairs, formerly Viceroy of India; President of the first Air Board.

² Now Sir Alan Burgoyne, Member of Parliament for Aylesbury.

62 PALL MALL.

5th June, 1917.

MY DEAR SUETER,

A few lines that you may know you are not forgotten. I don't write you, but the good work for a great Air Service still goes on.

More power to your elbow. Your friends at home are as staunch as ever.

Good luck to you and I hope to see you soon.

Yours as ever,

(Sgd.) ALAN H. BURGoyNE.

That was indeed a kindly letter sent to a banished man. Both Lord Montagu and Burgoyne were friends in need to all the naval airmen who were doing their utmost to establish a separate Air Service free from all Admiralty and War Office control.

Admiral Mark Kerr¹ states that Mr. Lloyd George and Sir William Weir claimed parentage for the Royal Air Force. But these pages show the seed was sown in the House of Commons, the House of Lords, and in the *Globe* newspaper in 1915.

Fortunately, we had the Marquis Curzon in the Cabinet at the time a final decision to create a separate Air Ministry was made, and those of us who were privileged to work with him know quite well where his sympathies lay. Both he and Lord Haldane backed up most strongly the Air Force Bill in the House of Lords at the time it was introduced in the House² of Commons by Major Baird. Also big-brained Lord Birkenhead (then Sir F. E. Smith, Attorney-General) went full out for a separate Air Service.

Before Mr. Lloyd George gave his wise decision, fully justified by events, there was a considerable amount of wire pulling by the older services to prevent an Air Ministry being formed. But Lord Cowdray and Admiral Mark Kerr brought the issue to a final decision, and it always appeared to me that by using Admiral Mark Kerr with his interest in air matters, somebody played the winning card that trumped the Admiralty's hand and gave us a separate Air Service.

We certainly do not desire to go back to the old days, when the Sea Lords desired to destroy their airmen for running what

¹ In his interesting book, *Land, Sea and Air*.

² 12th November, 1917.

Admiral Sir Reginald Hall considered a most efficient Air Service, for did he not say in the House of Commons—

It was my good fortune to be at the Admiralty in the early part of the War and during the latter part, and I have a distinct recollection of the very fine work of the Royal Naval Air Service. I have a still more lively recollection of the way in which they supplied the best machines and how they secured the best engines ; and although I do not want to make invidious comparisons I venture to say they got the best personnel, too.¹

Captain Wedgwood Benn,² a very brave and skilful airman, who had the distinction of serving with great gallantry on five fronts in the War, writes in his interesting book, *In the Side Shows*, as follows—

Whatever criticisms may be made of the early days of the Royal Naval Air Service, it was the service, of ideas *par excellence*, and no one can say how much sooner we should not have secured the mastery of the air if Mr. Churchill had remained at the Admiralty.

His departure was not a good thing for those who, as many of their comrades thought, had sacrificed a useful naval career for visionary adventures with toys. Theirs indeed was a rough road, but cheerfully they trod it. Their symbol was the beautiful golden eagle copied from a French Imperial design.³

There is no doubt that the Sea Lords were considerably embarrassed at the success of their Royal Naval Air Service. For were not naval airmen the very first in this country and of the Allies to penetrate hundreds of miles into German territory ?

Did they not, with the help of their colleagues in the military wing, break up the German Zeppelin menace to this country ? and also do much to help the military at the Front, both with machines and pilots ?

¹ *Hansard*, Debates on Navy Estimates, 16th March, 1922, column 2463.

² Recently Liberal M.P. for Leith, a fine House of Commons man and most able colleague of independent views.

³ Mr. Churchill wanted an eagle for a badge to be worn on the sleeve of the coat to distinguish the naval airmen. An artist was sent for and he produced a design like a goose. But Mrs. Sueter had a gold eagle brooch of French Imperial design that she had purchased in Paris. I took this eagle brooch to the Admiralty to show to Mr. Churchill and Admiral Prince Louis of Battenberg. They much preferred it to the goose design of the artist and adopted it for the badge of the Royal Naval Air Service.

Did they not enable the naval monitors to destroy the German cruiser *Konigsberg*? Did they not help to feed our sorely pressed military comrades in Kut? Did they not destroy some submarines and sink many mines? Did they not assist the surface ships in breaking down the submarine menace around our shores and in the Mediterranean? Did they not evolve the caterpillar landship that gave us the tank? No mean achievements these, and comparable with the good efforts of other branches of the Navy.

Wild horses would not drag me into suggesting, and I feel it would be grossly improper for anybody to say, the Noahs were jealous of their troublesome and very forward "air baby," that knew how to make war from infancy! Surely no event, political or otherwise, as this smothering of their "air baby" by the Sea Lords ever recalled so irresistibly the comic and pathetic epitaph, printed in *The Observer* of 10th July, 1927—

If I so soon was to be done for,
I wonder what I was begun for.

Neither could wild horses drag me into suggesting that years of peace had made some administrators in Whitehall flabby. I am mighty proud to have created under Mr. Churchill's strong encouragement the Royal Naval Air Service—a Service composed of able-brained men, full of new ideas, hard workers, hard thinkers, hard doers, and hard fighters.

I laughed at the hostility of the Noahs in those days. After witnessing the air pageant at Hendon this year¹ I laughed even louder.

Lord Curzon's kindly warning to me that I should be destroyed left me well prepared. My line of action was quite clear. It did not matter to me over-much whether I served or not.

Anyhow, those Noahs haven't destroyed me yet for my air independence, and, if I may be forgiven a personal note, it is this—

Not very long after I was placed on the Retired List, I went as a perfect stranger and presented myself as a candidate for

¹ 1927.

Parliament for the Division of Hertford. Many of the electors in that constituency have been most considerate and kind to me in every possible way.

Moreover, they have done me the very high honour of permitting me to represent them four times—once in a by-election and three times at a General Election they have returned me to Parliament. It is difficult to repay such confidence. All I can say is, I am most grateful to my supporters who are now my very good and much-valued friends.

When I first entered Parliament Lord Curzon had not forgotten me, and sent me the following letter, which I value with many others of his very much—

1 CARLTON HOUSE TERRACE,
S.W.1.

21st June, 1922.

DEAR ADMIRAL SUETER,

I really do not know if you are an opponent¹ or not of the Government of which I am a member.

But never mind. I remember the bold and courageous fight that you made for sound principles of Air Administration when we were associated in 1917 and also how you suffered for it.

Accordingly I welcome any success that comes your way.

Yours sincerely,

CURZON.

Both Lord Curzon and Lord Sydenham were tried administrators. They had developed brains of a high order. It was a treat to work with men of their calibre after some of the vacillating and stupid people in the Admiralty who could see no good in air development. To witness Lord Curzon handle these Noahs, or "gentlemen with temporary haloes of deity," as he called them, was fascinating.

All airmen owe much to the great help and wise counsel of

¹ I was a strong opponent of the then Coalition Government, because I thought, after having served in the Mediterranean many years, that Mr. Lloyd George's policy of backing the Greeks in Asia Minor against the Turks showed that neither he nor his advisers had the most elementary ideas of conditions in that part of the world. Events afterwards showed I was right. This terrible blunder lowered the prestige of this country in Europe for several years.

Lord Curzon and Lord Sydenham in those difficult days in which the separate Air Service run by a separate Ministry, entirely independent from all Navy and Army administration or control, was in the making. I trust the confidence these two great statesmen placed in the airmen's ability to run their own Air Service and develop the air will never be misplaced.

Many Governments have wisely backed up the pioneer naval airmen in their successful achievement in obtaining a separate Air Service as the surest means of advancing air development, for did not Mr. Baldwin recently remind Commander Bellairs of his statement in the House of Commons early last year,¹ when he said—

I think it essential to announce that, in accordance with the policy of successive administrations, the Government have no intention of re-opening the question of a separate Air arm and Air Ministry. We intend to pursue the organization of Imperial Defence on the existing basis of three co-equal Services.

In concluding this chapter, may an old air pioneer just say this? The Air Minister, Under-Secretary of State for Air, and Chief of the Air Staff, whoever they may be, and whatever political party they may belong to, are charged with a sacred trust, and that is, to do all in their power to resist those Noaahs who desire to smash up the Royal Air Force.

Many Members of Parliament do not consider the maintenance of a separate Air Force a party question, but a national one, and they are determined to do the utmost within their power to uphold the former decision of Parliament to have one Air Service.

Surely Mr. Pollen will not deny "Victory" to the sowers of the seed that fell on good soil and blossomed into "a perfect Air Force, which in skill and courage has given a unique example to the whole world." Such, in brief, was the tribute which General Italo Balbo,² the Italian Under-Secretary of State for Air, who was on a flying mission to this country, piloting his own machine, paid to the Royal Air Force.

¹ 1927.

² General Balbo visited this country in June and July, 1927.

CHAPTER IX

PRESENT AIR POLICY

" Loss of time is irreparable in War."

NAPOLEON.

IN March, 1928, Lord Cushendun, in discussing limitation of armaments, stated—

Air force squadrons, for instance, had been radically reduced. France had a much stronger Air Force. There was a great deal of idealism at Geneva ; it ought to be mixed and leavened with realism.

I suggest that in considering our Air Policy we ought to advocate a little more realism and a little less idealism.

The air defence of this country is manifestly a vital subject, and this has been recognized by four successive Governments.

On the 3rd August, 1922, the then Prime Minister (Mr. Lloyd George) stated in the House of Commons that as a result of an inquiry by the Committee of Imperial Defence the Government had decided to adopt a scheme submitted by the Air Ministry providing for a force of 500 machines for home defence. The Prime Minister stated that this decision would not prejudice a further expansion of the Royal Air Force, if later on this was found necessary to our national security.

Shortly afterwards there was a change in Government, and on the 26th June, 1923, Mr. Baldwin, who was then Prime Minister, made a statement in the House of Commons with regard to British air policy. In the course of this statement, the Prime Minister said—

The Government have come to the following conclusions with reference to British air power. In addition to meeting the essential air power requirements of the Navy, Army, Indian and Overseas commitments, British air power must include a home defence of sufficient strength adequately to protect us against air attack by the strongest air force within striking distance of this country. It should be . . . so arranged as to ensure that sufficient strength will be immediately available for purposes of defence.

Later on—on the 23rd June, 1923—in the course of a debate in the House of Commons, Sir Samuel Hoare, the Secretary of State for Air, said that the Government had to face the urgent consideration that so long as the world was what it was, it was the first duty of any Government, whether it was Conservative, Liberal, or Labour, to see that the defences of the Empire were secure and that, however friendly our relations might be with our neighbours, no Government could afford to allow this country to continue to be almost defenceless against air attack.

Again, on the 17th October, 1923, Sir Samuel Hoare, when speaking at a meeting at Colchester, said that British air power must include a home defence force of sufficient strength adequately to protect us against air attack by the strongest Air Force within striking distance of this country. He added that on the recommendations of the Committee of Imperial Defence, it had been decided to create with as little delay as possible, a home defence force of 52 squadrons, so organized as to make further expansion possible if that should prove necessary.

The subject was further discussed in the House of Commons on the 19th February, 1924, by which time a Labour Government was in office. On this occasion Sir Samuel Hoare moved the following resolution—

That this House, whilst earnestly desiring the further limitation of armaments so far as is consistent with the safety and integrity of the Empire, affirms the principle laid down by the late Government and accepted by the Imperial Conference that Great Britain must maintain a Home Defence Air Force of sufficient strength to give adequate protection against air attack by the strongest Air Force within striking distance of her shores.

The Air Estimates for 1924–25 were under discussion on the 11th March, 1924, the Labour Government still being in office. In the course of the debate, Sir Philip Sassoon pointed out to the House that the whole situation as regards defence was reversed. The first people to bear the brunt of an attack upon the security of these islands would be the man and woman in the street going about their round of daily business. It would

be the ordinary peaceful citizen, whose lungs would be the first to be affected by a poison gas, whose body would be rent and whose home would be destroyed by the bombs of an invader. He added that the ordinary elector was beginning to realize with acute anxiety this new fact of war.

Subsequently the present Government returned to office, and on the 12th March, 1925, Sir Samuel Hoare, who was again the Air Minister, stated in the House of Commons that the Government were trying to do what they said they would do and what the Imperial Conference had agreed should be done, namely, set up an Air Force adequate enough to protect this country against the strongest Air Force within striking distance.

It would be easy to find many other references to this subject in speeches made inside and outside of Parliament, but it is sufficient for the moment to say that the keynote of all these statements is contained in the last statement of Sir Samuel Hoare referred to above, which follows that the Government must set up an Air Force adequate to protect the country against the strongest Air Force within striking distance.

It will be seen from the foregoing that the policy of expansion in the national interests was adopted and ratified by four successive Governments. Whatever the political character of the Government in office at the time, there has been full recognition of the fact that methods of defence have changed through the coming of aircraft as a military weapon, and that this country has to make corresponding provision.

The question of national economy cannot, of course, be overlooked, nor can the situation arising out of the Locarno Agreement. As regards economy, it may perhaps be pointed out that the imperative necessity for economy has been continuously before the Governments when the policy of the Air Force has been accepted. It is a matter for investigation whether economies should not be effected in the older Services and the air arm allowed to expand normally in its first stages of development.

So far as the Locarno Agreement is concerned, it need only be observed that no other country is, so far as is known, proposing to reduce to any extent its Air Force or to curtail its development.

In November, 1927, France and Yugo-Slavia signed a security treaty, which will remain in force for ten years. Amongst the clauses, the following are of interest—

The two Powers bind themselves never to wage war on each other, and agree to settle any questions that may arise between them by diplomatic means, or by arbitration of a judge to be nominated by them, or according to the fifteenth article of the League of Nations pact.

If either nation is attacked without provocation the two Governments will communicate with one another so as to act together in order to guard their national interests and the situation as laid down by peace treaties. The two Powers bind themselves to take common action in case of a change, or an attempt to change, the political situation in Europe.

Italy's reply is a treaty with Albania. Earlier in the same year Signor Mussolini said: "Italy must be able to mobilize 5,000,000 men and to arm them, and our Air Force . . . must be so numerous that the surface of their wings must obscure the sun over their land." Nobody in Europe knows better than Signor Mussolini the dangers that may arise from conflicting interests in the Adriatic.

On examination, I find that—

British air expenditure has been reduced in the past three years. The figure for 1927 is 6 per cent below the figure for 1925, and that for 1928 is rather more than 10 per cent lower.

The *French* are budgeting for a 29 per cent increase in military air expenditure in 1928 as compared with 1927, on top of an increase of 37 per cent in 1927 as compared with 1926.

Since 1924 *Italian* air estimates have risen by no less than 75 per cent.

It is submitted that if the whole of the present-day international circumstances are carefully examined, it will be found that unless this country is to be a second-rate power so far as

aerial defence is concerned, then the programme of expansion already decided upon should be proceeded with and completed as rapidly as possible.

In Chapter XI, I have dealt fully with our successful experiment in establishing an air control in Iraq, and have drawn attention to the many millions it has saved this country. Our policy in Iraq is unlikely to be altered.

Leaving external matters and glancing at our domestic air problems, which are many, it may have been noticed that owing to financial stringency some of the normal expansion of the Air Force has had to be checked. This is unfortunate, and a little attention must be given to the necessity of continuity in the air industry, otherwise the whole source of aircraft design and supply will be jeopardized.

The training of the personnel for the Royal Air Force may be taken as a directly comparable case. At Cranwell there is a constant stream of cadets being trained as officers of the Royal Air Force, while at Halton there are similar courses for the mechanics. These two centres form the backbone for supply of personnel to the Royal Air Force, and a cutting-down of these centres would endanger the future supply of personnel. If economies in the Air Force vote are obtained by cutting off to a large extent the supply of aircraft an exactly similar state of affairs will arise in the industry. Trained men must be dispensed with, research organizations broken up and design staffs disbanded, skilled men who have been trained at much expense over many years for the technical posts which they occupy will go into other industries, and it will be impracticable to get these people back again if their services are required later on.

It will be impossible to ask the rising generation of engineers to qualify for aeronautical engineering and, indeed, it would be unfair to persuade them to do so when the precarious nature of an aeronautical career is so clearly before them.

The country relies on private enterprise for the design and supply of aircraft, and the British aircraft industry to-day

forms as the supply unit an essential part of the scheme of national defence.

Aircraft design and production is in a very special position. In the first place, technical progress in the art is rapid. New theories, new methods and new designs are constantly being evolved and have to be tried out. In the next place, the results obtained depend to a large extent upon the practical manner in which the designs are evolved. A design apparently superior on paper may have to be ruled out for production purposes owing to difficulties in construction and the high cost in man power and material such a machine would entail. In order to try out a design production orders must be placed, otherwise engineering shop methods for the production of new designs cannot be properly tested and tried.

It is apparent that if orders are small and experimental only, the cost per unit must be high, and it is only by placing production orders for machines and engines once they are tried out that the cost of production can be kept down.

It follows, therefore, that the British aircraft industry needs a constant working out of new designs tested on production lines if it is adequately to fulfil its place in the nation's scheme of air defence and if proper regard is had to economy.

Other points need consideration. The Universities must produce engineers trained in the higher theoretical work underlying aeronautical design, and the works must train up an adequate number of engineers, draughtsmen and mechanics to form a nucleus for expansion if occasion should require it. The aircraft industry must therefore receive due consideration as a definite part of air defence ; and when economies have to be effected proper consideration must be given to all the problems of the air industry and the whole Air Force, with its industry, encouraged as a whole.

I consider that the air defence requirements of the country should be dealt with on the broadest possible basis. A definite policy of expansion suddenly cut down and a haphazard policy of supply from year to year will lead to disaster. A continuous

and definite policy is essential, so that the aircraft industry can continue its researches and developments, also offer continuous employment to its workpeople and can offer inducements to its skilled engineering staffs for men to continue their aeronautical careers. This alone will keep the country in the forefront of aeronautical progress.

As recently as March, 1928, Lord Cushendun, discussing limitation of armaments, stated—

Our Air Force squadrons, for instance, had been radically reduced : France had a much stronger Air Force. There was a great deal of idealism at Geneva : it ought to be mixed and leavened with realism.

I suggest to my fellow countrymen and women that London, being the "hub" of the British Empire, needs protection not by idealism but by "first line" aircraft. By allowing our nearest neighbour to possess more than double the number of this type of machine that we have, we are not pursuing a prudent policy.

All who are interested in the adequate defence of our Homeland should press upon the Government and Air Minister the necessity for remedying this state of inequality at the earliest possible moment.

CHAPTER X

THE NEED FOR A MINISTRY OF DEFENCE

THE BEST IS YET TO BE

I do not think that the British constitution, as at present worked, is a good fighting machine.

THE LATE LORD SALISBURY DURING THE BOER WAR.

THE student of all questions relative to imperial defence must recognize that there always have been difficulties in drawing the line as to what particular work the armed forces of the Crown should undertake when they come close together in certain fields of operation. In the old days, when we had the two forces, the Navy and Army, the high-water mark where the sea butted the shore was a good line of demarcation. But even then there were some difficulties about coast defence, as every person who has studied the subject knows well.

Now that we have the third Service, the Air, which has to serve both the Navy and the Army and carry out its own independent work as well, a new administrative problem is created. It is not a solution of the problem to say : Get back to the Army and Navy having its own separate Air Service. During the War, and in all combined manoeuvres since the Armistice, the air has been a real connecting-link between the Army and the Navy.

If you set up a central Air Force for air work that has nothing to do with the older Services, with comparatively weak separate Air Forces attached to the Navy and Army, you weaken all ideas of close co-operation between the fighting forces and revert to the old order of watertight compartment administration that was so harmful in the early days of the War.

To anybody who studies the subject, it must be clear that the air should strengthen the link between the Army and the Navy, and surely it is wise to do everything possible to consolidate this link.

If you have three airs instead of one air, you at once start the old naval and military wing competition again, and have added the central air competition in all matters relating to: manufacture of aircraft, research work, obtaining engines, raw material, personnel, recruiting, training, inspection.

The Royal Air Force has now to assist in helping the Navy and Army to carry out the defence duties attached to them, and in addition has quite a distinct independent mission and must be responsible for the defence of these islands against air attack.

Many contend that in the co-operation between the airmen and the Navy, unless the former are trained in the Navy, it is dangerous in war and impracticable in peace. We are usually informed that the dear old fairway buoy at Lowestoft, which a naval airman is supposed to have bombed in mistake for a mine, shows how necessary it is that the Navy should train its own airmen. What all airmen are out for when war unhappily arises is to defeat their enemy and secure, if possible, a mastery, though it may only be temporary, of the air. If permanent, so much the better.

Now, will any naval officer who is a thinker dispute that in an air battle the skilled aviator is bound to succeed? Watch an air battle in the pageant held yearly at Hendon, and see how these pilots manoeuvre for position. It is a good illustration of a real air battle. Each pilot has to bring in his own individual skill, and the more skilful he is the more successful he will be. How can a naval officer,¹ chock full of naval learning, who has

¹ 1927 Regulations—Modified

FLEET AIR ARM SERVICE

It has been decided to modify to a certain extent the periods during which naval officers attached to the Royal Air Force should serve as pilots in the Fleet Air Arm. Naval officers are to be employed on flying duties for the whole of their time as sub-lieutenant (where applicable), lieutenant, and lieutenant-commander, subject to a minimum of two years in general service as lieutenant or lieutenant-commander. The old arrangement of dividing into periods from "A" to "E," with alternate air and general service, is abolished. It is intended that officers should not normally serve more than five years as pilots in one spell.

been trained to fly for a few weeks at one of the flying schools, then a few years' air work, and who afterwards occasionally does a little flying, compete with a highly-trained airman, who has devoted his life to the scientific study of air work. A pretty quick nose-dive into the sea would be the naval man's fate in an air battle with a highly-trained airman.

I am not saying that certain air duties cannot be undertaken by naval pilots. They can, and valuable work these naval pilots can do. But in real air fighting it is prudent for the Navy to carry in the seaplane carriers, if they would achieve success in air operations against an enemy, a fair proportion of highly-skilled airmen.

With good-will on both sides and in pursuance of orders from authority, there should be no more difficulty in using and working with the airmen afloat than with the Royal Marine units. Some people say the Navy dislikes carrying passengers, but I am not overmuch impressed with that argument.

The airmen can be of as much use as any other class.

Their mechanical training should make them most suitable in assisting with general ship work when required.

If the naval men are trained to appreciate air work, they will readily understand that the efficiency of the airmen may mean success—non-efficiency, disaster to the ship and the whole ship's company in any war operation the ship may be called upon to perform. When the young naval officer appreciates this point of view we shall not hear so much of passengers.

Perhaps the frictions that now arise between the Navy and the Royal Air Force have their origin largely with the Noahs of Whitehall.

The Noahs of the Navy never learnt a single thing about the air when they had an Air Service. But many of the younger naval men were trained as pilots and had direct knowledge in dealing with air matters. In these modern days it is impossible to conceive the Navy and Army without a proper provision of aircraft.

In the debates on the 1927 Estimates in the House of Commons, the most significant utterance of any Minister's statements was that made by the Air Minister, Sir Samuel Hoare, when he stated this—

Just as naval strategy does not tie up its force at a number of small isolated points but concentrates it upon two or three great centres from which it can be quickly reinforced at threatened points in various parts of the Empire, so it is with the Air Force. There also you should have your concentration rather than your small localized units. You should be able to bring this concentration to bear by means of Imperial air routes from any point that is desired from one end of the Empire to the other.

If air policy be applied from that point of view, I believe it might be used as an instrument of economy in our system of Imperial defence rather than as an additional form of expenditure.

In these few words Sir Samuel Hoare outlines what airmen have been pressing for years, and that is by developing air you can make economies in the older Services.

Under our present system these economies in the Navy and Army are always resisted. The First Lord of the Admiralty is paid to keep the Navy as efficient as his advisers consider necessary. In the Estimates he naturally presses for all he can obtain. If he did not, he would be negligent of his duty.

Similarly, the Secretary of State for War does the same, and presses for the largest estimates he thinks he can obtain. Mr. Lloyd George calls it fighting for the biggest share of the loot.¹

Neither the First Lord of the Admiralty nor the Secretary of State for War are likely to give in to any pressure from the Air Minister, and are far more likely to ignore his suggestions than otherwise. Who, then, is to decide?

The Committee of Imperial Defence has in the past performed valuable service. The very able Secretary, Sir Maurice Hankey, did his utmost to help the airmen in the early days. But I will ask him: Did all the recommendations of the airmen who formed the Sub-Committee of the Committee of Imperial Defence force the Admiralty to have Zeppelins in the North

¹ *Hansard*, 27th March, 1928, column 1045.

Sea during the time they could have been of the greatest service in the War? When it suits them, the Admiralty and War Office always ignore the recommendations of the Committee of Imperial Defence. This Committee breaks down because it has no executive authority. Lord Balfour's creation is now out of date, largely because of air development, and it now becomes necessary to consider some better form of administration than the Committee of Imperial Defence, with Cabinet control.

Whether this Committee has been efficient from the Army point of view I rather doubt, for in his very interesting book,¹ that great soldier-statesman, Field-Marshal Sir William Robertson, writes—

The most regrettable feature was not the time spent in reaching a final decision when war became imminent, but the omission to lay down beforehand an appropriate military policy upon which comprehensive preparations and plans could be based.

Also I recollect feeling that General Sir Ian Hamilton was badly served when I read² that the plans for the Dardanelles operations were not forthcoming from the War staff when he was sent to carry out operations in the Eastern Mediterranean, although a month had elapsed since it first became apparent that extensive military operations might have to be undertaken.

If my financial friends in the House of Commons will only bring their able brains to bear on this difficult administrative problem, they will readily realize that to obtain true economy with efficiency, and obtain the economies that Sir Samuel Hoare has hinted at, it is necessary to place an authority over the three fighting Services. I believe I am correct in saying that the late Lord Randolph Churchill was the first to recognize the necessity for an authority over the fighting Services in the form of a Ministry of Defence. This authority will question need of battleships, need of obsolete dockyards, need of cavalry, need of roperies in the Royal Dockyards, etc. The head of each

¹ *Soldiers and Statesmen.*

² Sir William Robertson, in *The Times*, dealing with March, 1915.

Department would have to make his case good to this authority, and be made to stand by his case.

My reader is asked to look at this problem from the financial aspect.

The outstanding feature of the debate on the Economy Bill of 1926 was the Chancellor's speech in introducing this measure to the House of Commons. Mr. Churchill gave an admirable exposition of the nation's finances, and showed that the area over which economies can be made is exceedingly limited.

If the White Paper issued with this Bill and the Chancellor's speeches are carefully studied it will be noticeable that our national expenditure for the previous three years had averaged £802,000,000, and, unless strenuous efforts are made by all those who have their country's welfare at heart, is likely to remain for some years near, or even higher than, that figure. This year it has increased. In glancing at the final balance-sheet, we find the estimated expenditure for 1927-8 works out as follows: National Debt, Sinking Fund, etc., £370,000,000; Road Fund and other consolidated fund services require £72,900,000; the Civil Services eat up £235,725,000; the Customs, Inland Revenue Departments, and the Post Office take £69,650,000; the fighting Services swallow £115,115,000. That is why the taxpayer was asked to shoulder a burden of £833,000,000 for the year 1927-8. Truly a colossal figure. No wonder we are at the present moment the most heavily taxed people in the world. In such circumstances it is imperative in the interests of all that the taxes that press so heavily upon industry be reduced and the income-tax made as low as possible to release more money for industrial development. Unless this is done we cannot regain prosperity.

Whilst everybody talks about the need for economy, few do more than generalize, with the result that the taxpayer sees the chance of relief getting more and more remote. Nobody can blame him for being extremely dissatisfied at the relentless opposition made by the spending departments to every suggestion that is made to bring about sane economies in

administration. Even the Chancellor of the Exchequer informs us that whenever he saw a chance of reducing the estimates he was met with opposition of so resolute a character that he was forced to surrender to it.

A glance at the staffs employed at the Admiralty and War Office is certainly illuminating.

I asked the First Lord of the Admiralty whether he could give in a tabular statement the number of battleships, cruisers, destroyers, submarines, torpedo-boats, minelayers, and aircraft carriers in commission and reserve in August, 1914, and July, 1927, the number of personnel in the Navy in August, 1914, and July, 1927, and the numbers of the administrative staff at the Admiralty in August, 1914, and July, 1927.

The official reply was¹—

	Seagoing Com- mission	Reserve	Under Repair	Naval Personnel	Admiralty Head- quarters Staff
<i>August, 1914</i>					
Battleships . . .	44	16	—	146,047	1,718
Battle Cruisers . . .	7	—	1		
Cruisers . . .	80	27	7		
Destroyers . . .	183	18	9		
Submarines . . .	72	—	—		
Torpedo Boats . . .	58	41	7		
Minelayers ² . . .	—	—	—		
Aircraft Carriers . . .	—	—	—		
<i>July, 1927</i>					
Battleships . . .	12	—	2	101,890	2,741
Battle Cruisers . . .	4	—	—		
Cruisers . . .	37	4	3		
Destroyers . . .	89	68	5		
Submarines . . .	43	10	2		
Torpedo Boats . . .	—	—	—		
Minelayers . . .	1	—	—		
Aircraft Carriers . . .	4	2	2		

NOTE. The number of ships shown in the table for July, 1927, will be increased during the financial year by two battleships, five cruisers, and one submarine.

¹ *Hansard*, 27th July, 1927, oral answers, 1254.

² 7 Cruisers were fitted as minelayers.

That is, with a large reduction of personnel and a very large decrease in the number of ships, the Admiralty requires an addition to their staff of 1,023 in order to run the Navy.

In 1914 we were on the eve of a titanic struggle, from which we triumphantly emerged, and at that time an excess of staff would have been pardonable. But now there is no excuse for any department to have any excess of staff over reasonable requirements. How does the First Lord explain this increase of numbers? He gave some details on 18th November, 1925, as follows¹—

To carry out the most ordinary clerical or other transaction of the day involves a far larger expenditure of effort than in 1914. The work of preparing pay lists and income-tax assessments now involves between three and four times the pre-war amount of work. In an ordinary case of the preparation of a superannuation claim it is necessary for the clerk to make five calculations in place of two in 1914. Again, a specific pay-list in 1914 involved four simple calculations and the writing down of twenty-seven figures; now twelve calculations are necessary, and seventy figures have to be written down. As rough indication of the degree of increased complexity of material, it may be mentioned that the list of naval stores in 1914 comprised about 33,000 items as compared with 76,000 to-day.

It might occur to responsible persons at the Admiralty and Treasury that savings could be made by abandoning much of this super-supervision, thus saving some of the taxpayers' hard-earned money. The Admiralty, and, indeed, the whole Civil Service, should remember Mr. Burke's famous saying—

The most audacious robberies or the most subtle frauds would never venture upon such a waste as an over-careful detailed guard against them will infallibly produce.

In January, 1928, the Parliamentary Select Committee on Estimates issued their report, and drew attention to the excessive staff at the Admiralty—a fact many of us have pointed out for some years.

The Committee asked for an explanation of the figures, and in

¹ *Hansard*, 16th November, 1925, column 360.

a memorandum the Admiralty claimed that more specialized and complex work justifies the great increase in their staff.

Substantial reductions can be made, says the report, without impairing the efficiency of the Navy.

Since this report was issued, I understand the First Lord has appointed a Committee to go into the criticisms of the Parliamentary Select Committee, and the only comment I wish to make is that under a Ministry of Defence it would be impossible for any Department to have such a scathing indictment of extravagance issued against it.

The War Office is almost as bad as the Admiralty, for in July last I asked the Secretary of State for War whether he could give the numbers of personnel in the Army in August, 1914, and July, 1927, and the numbers of the administrative staff at the War Office in August, 1914, and July, 1927. Sir Laming Worthington-Evans replied—

	Estimates, 1914	Estimates, 1927
	<i>Officers and Other Ranks</i>	
Army—Numbers (Vote A) excluding		
“Additional Numbers”	181,568 ¹	152,501 ²
War Office	1,878 ³	2,387 ³

It is difficult to understand why it is necessary to have a greatly-increased headquarters staff to run fewer men.

I notice the Master-General of the Ordnance Department is to run the tanks. This may or may not be a wise move. But I advise the tank experts to keep a sharp eye on the Master-General of the Ordnance himself, for did not a former holder of this great office say : “ Ten thousand pounds has to come off

¹ Excludes “additional numbers” 3,300; Royal Flying Corps, 1,429; and Central Flying School, 103 (see *Estimates*, 1914–5, page 12).

² Excludes “additional numbers” 11,999 and Native Indian Troops in the Middle East administered by the Air Ministry 2,000 (see *Estimates*, 1927, page 11).

³ The numbers for the War Office staff include attached officers, typists, messengers, and cleaners, but exclude Metropolitan Police, staff on loan to other Government Departments, and (in 1914–5) staff for military aeronautics; they also include local audit staff at out-stations.

my vote. Right ! Take it off the airship shed at Farnborough ; make its height dimension less." This was done, with the result that the Lebaudy airship was wrecked, and the height of the airship shed had to be increased at a cost of ten times the ten thousand pounds saved by the Master-General of the Ordnance.

During the 1926 debates in the House of Commons on the Navy, Army, and Air Estimates, member after member rose and expressed the greatest dissatisfaction at the lack of co-ordination and co-operation in these services and advocated the establishment of a Ministry of Defence without delay. As speaker after speaker urged this charge on the Government, I recalled the day in May, 1922, when I introduced under the ten minutes' rule my Ministry of Defence Creation Bill. This was given a first reading, but at that time many members openly laughed and jeered at the idea of a Ministry of Defence. They did not quite understand that by placing a control over the fighting Services, much overlapping and waste of effort could be prevented and many economies effected.

In the preamble to my Bill, I sought to establish a Ministry of Defence, consisting of a Principal Secretary of State, who would be President of the Ministry of Defence, and an Under-Secretary of State for each of the three departments, Admiralty, War Office, and Air Ministry. Under the presidency of the Minister of Defence, the Defence Council would be formed by appointing appropriate Service and civilian members. Also, powers would be obtained to appoint such representatives of the Dominions as their Prime Ministers may select to represent them upon the Council.

The Minister of Defence would be responsible to His Majesty's Government for the proper consideration of all strategical and tactical questions bearing on the defence of the realm, i.e. on the surface of the water, under the water, on land, and in the air ; for the proper equipment and maintenance of all arms of the three fighting Services in a state of readiness and efficiency, according to the principles of strategy and tactics ; to

arrange for the provision and regulation of an adequate supply of personnel to all three fighting Services ; to examine the estimates which may be prepared by each of the Services with a view to the co-ordination and reduction of unnecessary Services, and to maintain a balance as between one Service and another in the expenditure required to carry out the general scheme of defence. The Minister would have to satisfy His Majesty's Government that the actual expenditure is the minimum that can attain this object. The principal clauses of my Bill laid down that the Defence Council shall form the nucleus for an Imperial General Staff, and absorb the purely advisory duties now performed by the Committee of Imperial Defence. But after operational programmes have been approved by the Defence Council they shall be carried out by the Admiralty, War Office, and Air Ministry, and, except in special circumstances, the Minister shall only issue executive orders to active units and commanders-in-chief through the operations departments of the Admiralty, War Office, and Air Ministry, as may be.

All intelligence services shall be centred in the Ministry of Defence, where the departments of Director of Naval Intelligence, Director of Military Intelligence, and Director of Air Intelligence shall be very closely associated, together with certain other branches of the Secret Service now directed by other Departments. Except for the co-ordination of principles and system, training shall be administered by the respective departments.

PROVISIONS AS TO MATERIAL

The construction, inspection and testing of new material shall be carried out by a department of the Ministry of Defence, so as to provide a nucleus which shall be capable of expansion into a Ministry of Munitions in time of war, should His Majesty's Government consider it desirable. Detailed designs shall be elaborated in the respective departments.

Advisory bodies for research, scientific work, examination

of inventions, new ideas, etc., shall be formed under the Defence Council.

The Minister of Defence shall take steps to co-ordinate and centralize, with a view to efficiency and economy, the supply of all armament and other equipment, stores, and provisions as to the three Services. He shall be responsible for seeing that each of the fighting services is equipped with the most up-to-date weapons that modern science dictates.

PERSONNEL

The Minister of Defence shall be responsible for centralizing and administering all branches of recruiting for the three fighting services. This section may in time of war expand into a Ministry of National Service. As far as possible, the same system of giving orders, drills, drawing rations, stores, etc., will be adopted for the three fighting services.

The Minister of Defence shall centralize and administer all common subsidiary services, such as staff colleges, medical branch hospitals, dental, chaplains' departments, meteorology, transport, works and lands, etc.

FINANCE AND ACCOUNTING

The Minister of Defence shall regulate the rates of pay, pensions, gratuities, and allowances in all three services.

The Minister of Defence shall take steps to amalgamate and administer all accounting and audit departments, and shall institute as soon as possible a uniform system of accounting and auditing for all Services.

The Minister of Defence shall be responsible for the preparation and placing of all contract work.

CIVIL AVIATION

The Minister of Defence shall be responsible for the development and maintenance of civil aviation, having due regard to the defensive requirements within the Empire, comparable with the development and maintenance of civil aviation by

other leading powers, and for seeing that subsidies as necessary are provided, similar to those arrangements that have previously existed with armament firms, mercantile marine and cable companies. Air enterprise within the Empire shall be encouraged, to allow a nucleus being ready for immediate expansion should the necessity arise.

In order to place the members who serve at the Admiralty, War Office, and Air Ministry on a footing of equality, the members of the various boards are to be generally known as First Member of Naval Board, First Member of Army Board, First Member of Air Board, Second Member of Naval Board, etc., etc., and it might be convenient to change the nomenclature a little, such as: Navy Office for Admiralty, Army Office for War Office, Air Office for Air Ministry.

If we had had a Ministry of Defence before the War, it would have been impossible for the Admiralty to have sent the Battle Fleet to Jutland without—

1. The most up-to-date system of fire control.
2. An adequate number of airships and other aircraft. (These were repeatedly pressed for by the naval airmen, and as repeatedly refused.)
3. Special locomotive torpedo-dropping aircraft. (This method of dropping torpedoes from the air was demonstrated to Mr. Churchill and Admiral Lord Fisher at Calshot before the War.)
4. An adequate number of aircraft carriers.
5. As efficient searchlights as our enemy.
6. As efficient shells as our enemy.¹

A capable Minister of Defence would not permit new ideas to be blocked by the many petty traditions of the other Services; the naval airmen would have been allowed to state their case and then prove it in the air. The Minister would

¹ The Germans themselves admitted that the salvo firing of the Fifth Battle Squadron when it came into action was splendid, and that only the poor quality of the shells, which "crumbled like glass" on striking armour, saved several of their vessels from annihilation.—(Extract from *Naval and Military Record*.)

then weigh up the advantage of new weapons against old and balance old ideas against new ideas as they arise. It is common knowledge that no ship was sunk by enemy submarines where our S.S. and coastal airships patrolled. Yet we lost ship after ship in the Mediterranean because my big scheme for an efficient air patrol was rejected just after Lord Fisher left the Admiralty. Also the Admiralty ignored the warnings of the submarine pioneers, and little or no preparation was made by the Navy to combat the menace of these ever-watchful foes. Nearly everything that was done to defeat the submarine was developed during the War.

This unsatisfactory state of affairs would have been impossible under a Ministry of Defence. The truth of the matter is the Admiralty requires complete reorganization and much of it scrapped, like the roperies in the dockyards that have been so carefully preserved since Nelson's time, in spite of the fact that masts and yards were abolished many years ago.

The Admiralty live in a funny, watertight compartment, and strongly resent the audacity of any person who criticizes their waste of the taxpayers' money. The criticisms we made in the autumn of 1925 during the debate on the Naval Estimates have borne good and refreshing economies. The Rosyth and Pembroke dockyards were promptly reduced to "care and maintenance." But it is pertinent to ask why was not this done before, for the Sea Lords, when pressed, said these two dockyards were redundant.

Under a Minister of Defence the gun and shell shortage of the Army in the early days of the War could not have occurred. The reserves would have been criticized by an independent body outside, and not under, the War Office. The April number¹ of the *Army Quarterly* contains an interesting article by Major-General Sir Frederick Sykes. After advancing many astute arguments for and against a Ministry of Defence, he decides in favour of placing an authority over the fighting Services for the purposes of securing a "unified consideration

¹ For 1926.

and application of defence policy under a single control, and closely correlated with foreign policy."

THE RESPONSIBILITY FOR DEFENCE

Before the inauguration of the Royal Air Force, the responsibility for defence was divided between the Navy and the Army.

During the War, and in all subsequent peace manoeuvres, the air has become of vital importance to the two older Services, and in considering the whole aspect of defence the question naturally arises: Can the Navy prevent in any way an aerial bombardment of London? Can the Army and Navy combined prevent our great manufacturing centres from being destroyed?

Home defence should, under the new conditions of warfare, be our first thought. If this is admitted, and I think few will dispute it, the Air Force becomes, under the conditions that now prevail, our first line of defence. This is an important fact and the naval mind should grasp it. Does any naval mind contend that we could keep a war going with the *moral* of our people broken by air attack with explosive, incendiary, and poisonous gas bombs?

The Army and Navy are powerless to prevent an air attack on this country, yet we find we have not even a one-power standard in the air. Provisions have been made in the Estimates for last year¹ for £114,600,000 for defence purposes; out of this sum the Navy takes £57,300,000, the Army takes £41,050,000, Air takes £16,250,000. That is, the Air Service gets less than one-seventh of the total amount available for defence. Surely any thinking man must see something is radically wrong in the administration of our fighting forces when no adequate provision is made for the safety of our ports (naval and military), our great cities, manufacturing centres, and, lastly, our homes. Home defence should come first, not last. Why does it come last? Because those charged with our naval and military administration have a more vested interest, and exercise more

¹ 1927-8.

influence, than those charged with the aerial defence of this country.

I believe in the reduction of armaments, but I do believe the world is not willing to accept complete disarmament, and until it is it would be more prudent for the present and near future for this Empire to maintain moderate armaments on sea, under the surface of the sea, on shore, and in the air.

Nobody can foresee the future combinations of European Powers. We learn that Germany has recently signed a friendly treaty with Russia. It is very doubtful if the full text of this treaty will be made public, and most students of war will, I think, agree that the menace to this country lies within a few hundred miles of our shores. This is an air menace, and not a battleship menace. Yet we are about to expend more on the Navy this year than we did when the German Fleet was in being.

Marshal Foch's opinion is well worth recalling again to my reader. He said : " The potentialities of aircraft attack on a large scale are almost incalculable but it is clear that such an attack, owing to its crushing moral effect on a nation, may impress public opinion to a point of disarming the Government, and thus become decisive." The old order of the security of our island being safe in the hands of our Navy has passed on. The Navy cannot protect our important cities or industrial centres from air bombs or poisonous gases dropped from the air. The Navy and Army are powerless in this respect. " My Lords " at the Admiralty liketh not the new order. They are no longer the sole controllers of our destinies. The great efforts of past Sea Lords to stop air development have failed. Under a most capable Air Minister and far-seeing Chief of Staff, the Air Force of this country is being moulded into a service second to none in the whole world. The more I see of it, the more I admire those who have brought it into being. On all sides one sees keen and earnest young brains whose one goal is efficiency.

The time is now opportune to give the Air Force perfect equality with the Navy and Army by establishing a Ministry

of Defence for seeing that co-operation and co-ordination exists in the administration of these forces, and put a stop, as disclosed in Parliament, to the petty jealousies that are being fostered by some in the older Services to wreck our very efficient Air Service. How any person can persist in upholding the present wasteful system, whereby the Navy, Army, and Air Force largely work in watertight compartments, passes all comprehension. We should surely merge all common services, as outlined in my Bill, into one. The Air Force has set the example, and are doing this in several directions. More particularly should we merge the three staff colleges into one, and encourage students to think in terms of the fighting forces of the Crown, and not only in terms of the particular branch they belong to. An *esprit de corps* on these lines could soon be built up, and lead to a better understanding in all branches of the fighting Services. There is, I think, a general feeling amongst Members of the House of Commons that there are rather too many Cabinet Ministers,¹ and I think I would not be far out in saying that the Chancellor of the Exchequer would much prefer to deal with a Minister of Defence than have the First Lord of the Admiralty, the Secretary of State for War, and the Air Minister all attacking him for all the money they can get.

In May, 1927, Lieutenant-Colonel Heneage, M.P., advocated a considerable reduction in the Departments of State, and in a very able speech said²: "Some Departments create staffs in the country districts in order to justify their existence. In fact, they act like a snowball, and perhaps I might describe it by this parody—

Ministers have secretaries, with no one there to bite 'em ;
Heads of staffs, and under staffs, and so on *ad infinitum*.

I suggest there is a very general feeling all over the country

¹ Many Members of Parliament consider that a Cabinet of 21 is too large and cumbersome. They are of the opinion that efficiency in administration is impaired.

² *Hansard*, 4th May, 1927, column 1724.

to this effect, but it needs a considerable amount of investigation to prove it."

Colonel Heneage has thought out the whole matter most ably, and while one may not agree with all the sweeping changes he advocates, his speech shows he is a thinker, and will give all those who desire economies to be made and our national expenditure considerably reduced, food for much thought.

Mr. G. Lambert, speaking in the House of Commons¹ on the Navy Estimates, said—

I know that we are told at question time that the Admiralty and the Air Force were operating with the closest possible co-operation like brothers, but it struck me the brothers were more like Cain and Abel than two loving brothers.

If an authority like a Minister of Defence was placed over these Services, these bickerings would vanish. If not, I feel confident the Minister would soon dispense with the services of those who create difficulties.

The usual arguments against a Minister of Defence can be dismissed in a few words. The Minister of Defence is a post which is too important for one man. One man, it is said, cannot decide these grave State issues. He would have to be a super-man, etc. At the present time, the head of the State, the Prime Minister, under His Majesty the King, does decide these great issues.

But he has no one with executive authority, following the real work of all three fighting Services, to advise him. I heard the present Foreign Secretary, Sir Austen Chamberlain, when Leader of the House of Commons, say he had no time to read adequately the daily Press, and I can quite believe him, as I have some considerable experience in close contact with a First Lord of the Admiralty extending over some years.

Then the argument is made that the Minister of Defence would be a bigger man than the Prime Minister. That is an exceedingly stupid opinion. Nobody in the country, next to His Majesty, can have a bigger position than the Prime

¹ *Hansard*, 18th July, 1922, column 1969.

Minister. The Prime Minister would have to select his own Minister of Defence, and it is reasonable to suppose he would select a colleague who would work with him.

The great point is that a Ministry of Defence would lead to the economical and efficient administration of the fighting services, and in the case of need form the nucleus of a great Imperial General Staff in war time. I submit this view to all our great economists who talk so much but get so mighty little done.

In my constituency¹ the general view is that our national expenditure is far too high. They ask that some of the burden of the high taxation be lightened. The creation of a Ministry of Defence would reduce taxation. In talking this over with that very able ex-Chancellor of the Exchequer, Mr. Philip Snowden, he agreed with me that many millions could be saved by the most careful scrutiny of the Navy, Army, and Air Estimates, to prevent overlapping and expenditure on out-of-date establishments and weapons.

How any person in their senses can advocate that the Prime Minister, with his tremendous domestic and Empire responsibilities, should shoulder in addition the Presidency of the Committee of Imperial Defence, is quite beyond the understanding of an ordinary brain. In my judgment, our present system imposes too much of a burden on the Prime Minister. I have had in the course of my Parliamentary duty to attend in the Prime Minister's room to lay before him, with other Members, the case of the ranker officers appealing for their pensions to be readjusted, the marriage allowance for naval officers, etc. It is mighty considerate of the Prime Minister to look into such questions, but, surely, some of the many Ministers might look into these minor matters for him. Just fancy a Prime Minister of this great country, this great Empire, being burdened with such comparative piffle as marriage allowances for naval officers !

A Minister of Defence, in my judgment, would assist the Prime Minister in his heavy burden of office, and would add

¹ Hertford Division.

to the efficient and economical administration of the fighting Services, and I feel very confident that a Ministry of Defence would cure many of the Whitehall ills. Would not the Noahs like to have to explain to a critical authority their reasons for blocking new ideas ?

This efficient administration of the fighting services is now in the minds of many of the thinking and progressive men in the House of Commons. They were grateful to the able and popular Chief Liberal Whip, Sir Robert Hutchinson, for raising on 27th March, 1928, this question of a Ministry of Defence to co-ordinate the work of the three fighting departments. Several members spoke in favour of creating this ministry, as they desire most earnestly to see the administration brought up to date with regard to efficiency and economy. They were not exactly enamoured with the Prime Minister's speech which, to my mind, showed, with its vast multiplication of committees, the real necessity for creating a Ministry of Defence to replace the present complicated system which would take a super-super-man to master.

Colonel Moore Brabazon, our pioneer airman, during the debate, said—

The speech of the Prime Minister to-night was the most damning indictment we have ever heard against the present system of administering the " defence forces " of this country.

On the purely economy side, may I recall that Mr. Baldwin informed us in his election address, issued in October, 1924—

The burden of taxation weighs heavily upon industry and trade, diminishes real wages, and, in a variety of ways, adds to the cost of living. To assist in relieving the community of this burden the most rigid economy in administration is essential.

In my judgment, our people, in the interests of economy and efficiency, would be wise to set up a Ministry of Defence for the administration of the three fighting Services.

Methinks I see in my mind a noble and puissant nation rousing herself like a strong man after sleep, and shaking her invincible locks ; methinks I see her as an eagle, mewing her mighty youth, and kindling her undazzled eyes at the full noonday beam.

MILTON.

CHAPTER XI

THE EMPIRE AND AIR DEVELOPMENT

AIR CONTROL IN IRAQ: HAS IT BEEN A SUCCESS?

“NEON’S” conception of further Empire development is that we should abandon the air movement and make no attempt to improve travel and transport facilities over the lands of our great estates.

In that view I differ. My conception of the case is that the British Empire is not confined to these small islands and a few scattered possessions. It consists of the great self-governing Dominions, the Crown Colonies, the Dependencies, and Mandated Territories, as arranged with the League of Nations. A vast area to control. We are told that one-quarter of the population of the world and one-quarter of the earth’s surface comes into the association of the free nations of the British Commonwealth.

Many of the people of these lands before our connection with them had experienced nothing but social and political upheavals. We have brought to some of them a feeling of security and, above all, peace.

Fine words were spoken by Mr. Baldwin in a farewell speech at Winnipeg on 14th August,¹ when he said—

All we want to do is to develop ourselves and our countries in peace. That will be our great contribution to the world.

Having taken on this colossal burden of Empire, it is incumbent upon us to do our utmost to improve the conditions, as far as we can, of all people who owe allegiance to our King. At one time we were the great manufacturing centre of the world. But this is no longer the case. During and since the War many nations that depended upon our factories are now more or less self-contained, and the great problem before our industrialists is where to look for fresh markets to

¹ 1927.

maintain, and, if possible, improve, the standard of living of our people.

In some trade returns that the Empire Industries Association have recently forwarded to me, I notice our exports, between 1925 and 1927, of food and drink, fell by $2\frac{1}{2}$ millions, raw material by $5\frac{1}{2}$ millions, whereas manufactures fell by nearly £39,000,000, and although our exports in 1927 were of larger volume than during the three years preceding, they are still 21·4 per cent below 1913, while the imports are 20·3 per cent higher.

These figures make it perfectly clear that much unemployment is due to the adverse movement in the trade of manufactured goods.

Europe is becoming, through high tariff walls and exchange difficulties, less accessible for the marketing of our goods, and we are being forced to develop, by every conceivable means, new markets.

The masters of industry, in speech after speech, are pressing upon us the necessity of developing to the utmost our own estates.

Great delays occur to those who now desire to do business with different parts of our lands. People up-country are often cut off from the more civilized centres by many days, many weeks, and even months, of travel.

All this hinders good administration, quick intercourse, and undoubtedly is bad for business and general commercial advancement.

But a new ray of sunshine is coming to these people in distant lands, and that is the possibility of developing air travel and cutting down the present months of travel into weeks, weeks into days, and days into hours. It will enable vast spaces, now almost vacant, to come within the range of ordinary air communication.

This development of air travel is proceeding by leaps and bounds in many parts of the world. In other parts it is quite stationary.

Surely, then, we should create a real Empire air policy, and

use our air resources for linking up the scattered portions of our vast Empire all we possibly can.

There are three methods of air travel: (1) by aeroplane, (2) by seaplane, (3) by airship. Travel by aeroplane is now familiar to many; only a few fields are required, or a slight enlargement of cricket and football grounds, to form good landing-places, with some sheds to house the machines. There is nothing easier than developing commercial air routes. Their cost is microscopic when compared to the construction of great commercial harbours, long railway routes, and large railway stations or termini.

In many parts of our Empire, seaplane development can be of the utmost importance. Particularly in places where the small coasting steamer, with her cramped quarters and low speed, would be the only competitor, and it does not require much imagination to see how seaplane travel would be of considerable advantage for quickening transport of light commodities, mails, and passenger traffic. Important advances have of late been made in air speeds, whereas surface ship speeds and train speeds for economical running have nearly reached their limit. In the near future we may regard 120 m.p.h. as a likely cruising speed for certain commercial machines.

Commerical flying boats have been developed from our first Naval Air Service seaplanes. But they are still in their infancy. With good designers, capable constructors, present-day knowledge of all-metal machines, new methods as used by the large airship constructors for preventing corrosion of metals, the flying-boat should work out as a good commercial proposition, particularly in tropical lands.

These boat-type seaplanes can land on rivers and lakes, and be the means of opening-up parts of countries that are now inaccessible. The more one studies seaplane work, the more necessary it is to consider our trade routes. Wherever our coaling and oil-fuel stations exist, we could have a whole system of seaplane bases, and it is a question whether a re-organization of the protection of these stations, to see how

air can assist in economical defence measures, is not now necessary.¹

Many travellers by steamship would like to accelerate their mails by the use of aircraft flying from the deck of a ship. Some figures that I had tabulated, showing the run required by a Bristol Scout in flying off the deck of our seaplane-carrier *Vindex*, are of interest. The flying deck of this ship had 64 ft. available run. In the first experiment, the machine was in the air after running 46 ft., and in the second the machine was in the air after running 26 ft. In both cases the air speed over the deck was 27 knots.

The following table indicates the length of deck we required for early Bristol Scouts to make successful flights on a calm day in terms of ship's speed—

Speed of Ship	Safe Length of Flying Deck Required on a Dead Calm Day
Knots	Feet
25	30
23	42
21	54
19	66
17	78
15	90
13	102

There would be considerable difficulties in flying these machines from the deck unless a tail guide were fitted to maintain the machine at the correct flying angle, and in the proper direction during the early part of the flight, when the speed is insufficient for effective steering and the torque of the engine is tending most to deflect the machine. We developed a very successful type of tail guide and used it on many occasions.

In returning to America, after his great trans-Atlantic flight,

¹ Chapter X.

Mr. Chamberlin flew off the deck¹ of the liner he travelled in to show how a business man can hasten the delivery of ocean-borne mails when they are of great importance.

At present the airship is not so far advanced as the seaplane or aeroplane, because little money has been expended upon airship development and airships have suffered much from varying policies of different Governments. Airships have one important advantage over aeroplanes and seaplanes in that they have a great range of action and do not have to depend upon foreign countries for landing grounds.

If the three types of aircraft are utilized as may be most suitable, to form proper air routes, to link up distant places, a tremendous step forward in Empire development can be made, and the whole question assumes an entirely different aspect. I believe the feeling that the closest contact is most desirable between our people is in the heart of every true-born citizen of the British Empire.

There are geographical limitations to steamship and railway contact. In some cases road connections are difficult; in others impossible. In many parts of the Empire we could establish a network of airways similar to that now established over Germany and in Northern Europe.

If this is done, it will do more to strengthen the seeds of Imperial patriotism than anything else. Few of we elderly people will gather the fruit or reap the harvest. But I submit that the air achievements of the present-day have fully justified those of us who pinned our faith to the air, and never once wavered, nearly twenty years ago.

This development is shown in the great trans-Atlantic and trans-Continental flights made by gallant airmen during the last few years. Is it illogical to assume that air travel and air transport for light goods will continue to develop in just as efficient manner as sea, road, and train travel?

¹ Mr. Chamberlin took off in his biplane from a sand-strewn runway constructed on the boat deck of the *Leviathan* when she was about 150 miles off New York and made a successful flight to Curtis Field, Long Island.

In the evolution of sea travel, look at the millions and millions of pounds sterling expended since the Elizabethan days upon great commercial ports, docks, and building slips, for increasing the efficiency of sea travel and for carrying our water-borne commerce to all parts of the world. Southampton, Bristol, Glasgow, Liverpool, Hull, London, have had much money expended upon them. To protect our great arteries of trade many more millions and millions have been required to create our Navy. Large dockyards have been evolved, costing millions and millions, for building and repairing war-ships, such as Portsmouth, Devonport, Chatham, Sheerness, Rosyth and Pembroke. Look at the millions expended upon breakwaters for sheltering our naval ships at Dover, Portland, Gibraltar and Malta. Look at the millions expended upon horses, carriages, carts, motor-cars, charabancs, motor lorries, with the millions the Road Fund and local authorities distribute annually for the upkeep of roads. Again, look at the millions expended on the development of our railways from the time of the "Rocket." Compare the "North Star," one of the two broad-gauge locomotives used at the opening of the first section of the Great Western Railway in June, 1838, with their new engine, "King George V." The advance in locomotive engineering has been tremendous.

Then why this stupid outcry about the provision of a few millions to develop the air, with all its vast possibilities, which are more far-reaching than sea, road, or train travel can ever possibly be.

"Neon" suggests that Nature provides harbours for sea-going vessels.¹

I have, in the course of my duty, had to travel in many parts of the world, and have seen the results of millions expended upon harbour improvements, such as dredging, breakwaters, berthing and docking accommodation, not only in this country, but many distant lands. Will "Neon" ask the Port of London Authority the number of millions expended upon the docks

¹ *The Great Delusion*, page 23.

over which they exercise authority, since the first records were kept. I fear the figures would be staggering.

Let us be sensible and devote a few millions for Empire air development in exactly the same way as we have provided the money for developing our railways, roads, and our great mercantile marine. This money has not been wasted. We have benefited by becoming the greatest Empire the world has ever seen and in addition we are a great commercial world power. Airmen want to play their part in helping to keep this costly-earned position.

May I criticize the Government, the Air Ministry, my colleagues in the House of Commons, particularly those on the Economy Committee like Colonel Gretton, Mr. Basil Peto, and Commander Bellairs. They all think too much about the expense of air effort. I would say to these economists: You are blocking Empire development by making a god of gold. Let a little of it out, as in War days. In air development, don't trouble to audit the accounts too closely to see if they balance. Any deficit there may be will be repaid one-hundred fold in giving the settler in up-country places quick intercourse with local towns, in case of sickness, rapid facilities to fetch a doctor, or an easy means of taking himself, wife, or child to hospital. Give him his regular supply of tobacco, pipes, letters, papers, felt slippers, tea, etc. This will invite confidence in men and women to make more use of productive outlying areas.

The settler and his people will become more content, they will work harder, earn more money, and be able to purchase more goods and so create new markets.

Many men and women in this country would emigrate if they felt certain that they would not be cut off from all the amenities of life for long periods of time. Any man who has travelled in America knows full well that we have of late rather lagged behind in Empire development. This is largely due to the faulty, or rather, backward, state of rapid communication.

Air development will improve matters in this connection.

It is now becoming inseparable from trade development. Most people who really study air problems have a very great faith in the future. They know the Mother Country and self-governing Dominions have vigorous and resourceful airmen ready to establish commercial air routes wherever necessary, to link up the most distant places of our scattered Empire.

Much help is necessary in the form of practical encouragement. Everybody must remember that the Orient liner *Orama* has been developed from the first passenger ship, the "Ark."

Train travel, with its present comfort, has been developed from the days of the "Rocket"; the Rolls-Royce luxury limousine from the stage coach. Money has not been spared in developing any of these forms of travel, and big-brained Britishers have been responsible for much of this sea, road, and train development. Gallant airmen such as Hawker, Alcock, Scott, Maitland, Ross-Smith, Cobham, Pulford, Samson, Barnard, Carr, Lindbergh, Hinkler, Fitzmaurice, and many others, have played, or are playing, a large part in blazing the trail across the Atlantic from Canada to Clifden,¹ Ireland to Labrador, from Cairo to the Cape, from this country to India and Australia. They are doing real pioneer work for the Empire.

We were fortunate in having the Duke of York, a trained seaman and airman, to visit New Zealand and Australia in connection with the official opening of the Federal Seat of Government at Canberra, where he met Lord Stonehaven, formerly Sir John Baird, one of the most arduous early backers of the air movement this country ever had. Lord Stonehaven flips about Australia in an aeroplane and wins the admiration of all the old air pioneers. I feel confident that the Duke of York, in his wide travels in Australia, will have seen the possibilities of developing air travel in that great Dominion.

Distance, distance, is the snag in many of these new countries, and air travel can diminish distances, as previously understood. Legislators should foster this air movement, and accelerate it all that is possible, if they desire to increase and

¹ Ireland.

develop their great countries. One of the things that always strikes naval men is that so much of our Empire is unoccupied and unproductive when compared to the other parts of the world we visit. Most of us who own even a field or two, like to see it utilized.

Surely the great men who won the War, both in this country and in our Dominions, can solve this problem of peopling the vacant spaces. I do not believe it is insoluble. In this country we have too much overcrowding, with nearly a million unemployed.

Our people, the Press, and all my colleagues in the House of Commons, are continually seeking ways to alleviate the lot of the unemployed. By opening up our idle lands and connecting them with a network of air routes, much can be done. Work can be found in this way for all those who desire to take their fair share of the burdens of this life.

If we are to maintain our position in the world, we must develop all our land and profit by the new markets that will become available.

The air can play a good part in this further Empire development. Our airmen are full of adventure. Let the Statesmen call in their aid in opening-up the millions of acres of land now unproductive.

Consider the money voted for Empire settlement. We have expended but one-fifth of the sum approved by Parliament. Look at the millions of money expended upon doles, and what have we to show for it? Nothing, except an army of men and women not living a full life. This waste of man-power is lamentable.

One of our able pioneer airmen, Major Hemming, who is doing great service in seeking out new areas for development, writes ¹—

The aeroplane is a key to the development of inaccessible resources of the Empire.

May I supplement this wise opinion by saying it is the Golden Key!

¹ In *Air League Bulletin*.

When Mr. Amery was First Lord of the Admiralty he turned a cold eye on me, as he had no doubt been told by the Noahs at the Admiralty of my awful air misdeeds. When he returned from his long flights with Sir Samuel Hoare in Palestine, Iraq, Egypt, etc., I noticed his eye had softened. He had in his air travels come across airmen, and perhaps found they were not quite such villains as the Noahs painted them to be. He saw there was some purpose in the work of airmen.

May we probe this purpose? In the Report on Iraq Administration from April, 1922, to March, 1923, to the League of Nations, by taking the following extract—

The Royal Air Force took control of British forces in Iraq on 1st October, 1922, when Air Vice-Marshal Sir John Salmond, K.C.B., C.M.G., C.V.O., D.S.O., assumed command.

Throughout the period under review Iraq was faced with a serious external menace from Turkey; there were considerable concentrations at Jazirat-ibn Umar, while other centres had been gradually effected. This situation on the Northern Frontier had, as has been stated, its reaction on internal affairs throughout Iraq. It served to foment restlessness and to give moral support to intriguers and ill-disposed persons wherever their propaganda could obtain a foothold; to delay the development of a normal state of security in the country; and in general to confuse the original problem of maintaining internal control under air command.

As an instance, the Turkish irregulars operating south-eastwards from Rawanduz were enabled, because of the moral support which the external Turkish menace gave them, to achieve results among the turbulent Kurds of this area which never could have been achieved had it not been felt by the tribesmen that the regular forces of Turkey were behind them.

This Turkish menace, which had not been calculated for at the time when the scheme of R.A.F. control was decided upon, necessitated the continued maintenance in Iraq of ground troops far beyond the scheme. Reductions in this respect were not begun during the period covered by this report.

The details of this menace and the measures taken to meet it are not for consideration in this report, but its existence and effect as a factor aggravating the various minor problems of internal lawlessness with which the Air Force scheme was called upon to deal must be borne in mind.

In tracing the progress made during this first six months towards a normal condition of internal order and security, it is convenient to consider Iraq proper separately from Kurdistan in Iraq.

The general situation in Iraq proper at the end of September, 1922, has been fully described in the first section of this report.

During the six months under review various minor air operations were carried out in Iraq proper.

Thus, in October, in the Nasiriyah area, air action became necessary in consequence of the attitude of defiance to Government adopted by a group of five sheikhs. Offensive action was taken against the ringleader and demonstration flights made over the remaining four. As a result three of the confederates submitted to Government while the ringleader's own tribesmen, together with those of his one remaining supporter, deserted him. He remained, however, at the head of a following of some 200 malcontents and fugitives from justice, with whom he proceeded to hold up caravans on the roads and to terrorize the district.

Air action was continued against him and in a very short space he made unconditional surrender. At the same time another local sheikh in this district thought that an opportune moment had now arrived to defy the Government. An ultimatum dropped on him from the air, however, immediately secured a satisfactory change in his views.

At the end of October, in the Diwaniyah division, in an area so intricately intersected by irrigation channels that any operations by ground troops are very slow and inconvenient, armed defiance of the police called for air action. As a result the police were enabled to effect the arrest of the offending sheikhs.

In December certain sheikhs of the turbulent tribes situated on the banks of the Adhaim river refused to come into Government. An aerial demonstration was made and leaflets were dropped warning them to report under threat of air action. As a result the sheikhs submitted without air action becoming necessary.

At the end of January, near Diwaniyah, a car containing the Divisional Adviser was fired on and the Adviser wounded by some brigands on the road. These brigands, it transpired later, were at the time lying in wait for a sheikh whom, at the instigation of the sheikh of a neighbouring tribe, they intended to murder.

The sheikh concerned was ordered to hand them over and to come into Government for an inquiry to be made into the whole incident. He failed to do so and air action became necessary. After action had been taken the police were enabled, in co-operation with aircraft, to enter his villages and deal satisfactorily with the situation.

At the end of March, in the Mandali district, inter-tribal differences promised to develop into an outbreak involving several neighbouring tribes in inter-tribal fighting. An air demonstration, however, persuaded the disputants to submit their claims to Government decision and stabilized the situation.

These were the principal occasions on which aircraft were engaged in operations, in Iraq proper during the period now under review.

In every instance air action was only necessary on a surprisingly limited scale. Had it been necessary to exact obedience by the employment of ground troops the cost in time and money, if not also in lives, would have been immensely greater. A further consideration, which is very pronounced in dealing with lawlessness, particularly amongst the Euphrates tribes, is the entire elimination, in the case of air action, of provocative effect. Past history has proved that the presence of ground troops in these districts serves as a focus for concentrating rebellious action by the tribes, while any small success on the part of the latter may magnify a minor disturbance into a serious rising. Further, the dispatch of ground reinforcements to any particular spot is liable to give birth to wild rumours among the surrounding tribes to the effect that a rising is about to take place, and thus to produce an atmosphere of excitement and unrest in places which were previously tranquil. These dangers are altogether avoided by the use of air action.

In Kurdistan in Iraq the situation at the end of September, 1922, was far from satisfactory.

As has been described elsewhere, a Turkish garrison had been holding Rawanduz for the previous two years, and from this base a campaign of propaganda had been carried on south-eastwards through Kurdistan, as far even as to Halabja. This campaign, under the able and energetic control of Euz Demir, had been backed by lavish promises of Turkish regular support, by gifts of ammunition to the tribes, and by the establishment of posts of Turkish irregular troops at the various points of tactical or tribal importance along the main routes towards Arbil and Rania.

Various small levy columns which had from time to time been sent into Kurdistan had not succeeded in stabilizing this situation in our favour, and in September, 1922, a mixed column of Imperial and levy troops, which had been sent to Rania to restore the unsatisfactory situation which had arisen there as a result of Euz Demir's activities, met with a reverse. It was with difficulty extricated, with some loss both in men and material, including parts of two guns.

In consequence of this reverse it had been considered advisable to abandon our hold on Sulaimani also.

The prestige of the Turkish irregulars had been very greatly

enhanced and their activities redoubled as a result of this twofold success, and it had been possible by the middle of September for Euz Demir to establish Turkish posts at Keui Sanjaq and at one of the crossings of the Lesser Zab within 40 miles of Kirkuk.

Extensive air action was accordingly taken. By 5th October the Turkish post at Keui had been forced to leave and a political officer with a police escort had been enabled to re-enter the town without firing a shot and to re-establish there a Government control which has been maintained ever since.

Throughout October the Turkish posts in Kurdistan were attacked by air wherever located and were forced to withdraw from the Rania district.

During the next four months air action, and, where tactically suitable, combined action by aircraft and small levy detachments and tribal Lashkars, was maintained against such of these Turkish irregular detachments as took up positions from which they could have a prejudicial effect upon the law and order of the districts which were under our settled and effective Government administration.

Although the weather at this time of the year is unfavourable for air action amongst the Kurdish mountains, and in spite of the fact that the R.A.F. units were being much distracted by the Turkish menace north of Mosul, air action definitely checked the further infiltration of Turkish irregular troops and the extension of the area under the direct influence of Euz Demir, and was the first actual set-back given to the Turkish activities in this region.

Sheikh Mahmud, however, who had been reinstated by us after the evacuation of Sulaimani soon began to intrigue with the Turks actively against us, and it was known early in the new year that he had formed a plan to attack Kirkuk in March. Meantime the fortunate capture by the police of Euz Demir's dispatches to G.O.C. Jezirah front disclosed plans for the recapture of Keui Sanjaq and for an attack upon Arbil and Kirkuk by Turkish forces.

A situation had arisen in Southern Kurdistan, the seriousness of which was in no small measure due to the Turkish menace. If it had developed into an attack, an aggressively hostile Southern Kurdistan on the right rear flank of the troops concentrated at Mosul would have proved a serious embarrassment. It was necessary, therefore, to deal with this situation promptly and decisively.

Air action alone in such difficult country might have taken too long to achieve its object, but information as to the progress of events at Angora at this time showed that it would be possible to use the troops at Mosul for this purpose, and still to have time, if the external menace became imminent, to bring them back to the threatened

front. It was accordingly decided to clear up the whole Kurdish situation in as short a time as possible by a combined ground and air operation for the capture of Rawanduz.

The employment of ground troops on an extensive scale in Southern Kurdistan had been considered a hazardous and unsound undertaking by previous G.O.C.'s, and this opinion was probably a very wise one.

However, the introduction of air control gave full value to the air factor and the A.O.C., with his particular knowledge of the effect of this new factor, was able to judge such an operation as suitable. The operations themselves do not properly belong to this report, for they were not only carried out after the end of March, 1923, but were also largely necessitated by external influences. Their success, however, proves the soundness of the original decision to undertake them, which decision would not have been arrived at by a commander who did not possess an intimate knowledge of the air arm and the inestimable value of ample air power.

The progress achieved during these first six months of air control may be summarized as follows—

An ordinary outbreak of lawlessness or defiance of Government could be rapidly, effectively, and economically dealt with by air action. *An outbreak on a large scale was less likely to occur owing to the rapidity and simplicity of checking it in its incipient state by air action, while the non-committal nature and unattractive barrenness in profit to the rebel of such action undoubtedly had its damping effect.* It is a fair corollary that the absence of detachments which the great mobility of air action admits and the unprofitable task of "beating the air" may prove a sure deterrent to any outbreak developing on a large scale.

The above deals only with the aspect of punitive action, but the effectiveness of air control would be only partially considered if mention was omitted of its value as a threat and as a means to close co-ordination and co-operation of administrative effort over an immense area, etc., provided with other means of communication. An aeroplane or formation of aeroplanes, either employed for the purpose or on some administrative duty, can be seen in the air by a widely-spread population and provides a tactful but effective reminder to many of the existence and power of Government.

Without air transport the niceties of administrative and military touch are impossible with other existing means of travel in Iraq, and perhaps the greatest achievement of air control in Iraq during the six months under review has been the introduction of this inestimable asset. By its means it has been possible to achieve a

highly centralized yet widely understanding intelligence which is the essence of wise and economical control.

Then in a later Report on Iraq Administration from April to 2nd December, 1923, the following extract is of great interest—

During the whole period under review, a main factor in the pacification of the country has been the Royal Air Force. By prompt demonstrations on the first sign of trouble, carried out over any area affected, however distant, tribal insubordination has been calmed before it could grow dangerous, and there has been an immense saving of blood and treasure to the British and Iraq Governments. *In earlier times punitive columns would have had to struggle towards their objectives across deserts or through difficult defiles, compelled by the necessities of their preparations and marches to give time for their opponents to gain strength.* But now, almost before the would-be rebel has formulated his plans, the droning of the aeroplanes is heard overhead, *and in the majority of cases their mere appearance is enough.* This domination of the country by aeroplanes has, however, its possible drawbacks. In the first place, their passage is so easy that local officials are apt to ask for their help in circumstances in which police could be more properly used, or sometimes in order to help themselves out of difficulties caused by mistakes of their own administration. All applications from the Iraq Government for air action are therefore scrutinized by the High Commissioner most carefully before they are endorsed, and no air operation is carried out without a full preliminary report by a British administrative inspector. *In the second place, a result of such complete dependence on the aeroplane is that the Iraq troops have been little tested.* The funds in the Iraq Defence Budget are so limited that there is no money for troop movements which are not absolutely necessary, and the air officer commanding is unwilling to allow untried troops to risk a defeat which might cause all the unruly elements in the land suddenly to flare up. The Iraq Government is fully alive to this danger, and is devoting much thought to the expansion and training of its army with the help of British military officers, whose services have been lent to it. The air officer commanding has expressed his satisfaction with the appearance and training of the Iraq troops and there is every reason to hope that they will, when the time comes, be strong enough. The formation has been suggested of a certain number of exemplary units of each arm with British officers in executive command. The army is supplemented by an admirable police force, the only defect of which is the comparative smallness of its numbers.

On 17th January, 1928, we learn from Bagdad¹ that the popular indignation against the Wahabi raiders had subsided, and from 22nd December, 1927, no further raids had taken place. The Government had garrisoned the posts along the the frontier with Iraq troops, and—

In addition the Royal Air Force, with headquarters at Ur of the Chaldees, is patrolling daily. Artawiyah, the raiders' headquarters, was found deserted, and the whereabouts of Faisal Al Dowish are unknown.

The general impression is that Faisal is disappointed at not receiving Ibn Saud's support, and that faced as he is with opposition from the air, he will raid no more. Nevertheless, it is too early to state that all danger is past.

Since this communiqué, there has been considerable unrest, Reuter informs us on 5th April, 1928, that—

The Royal Air Force and Armoured Car Wing are preparing for action against a large army of Wahabis who are known to be moving not far from the Iraq frontier, if and when they attack Iraq.

The strength of the Wahabi forces is estimated at between 3,000 and 5,000. Their precise objective is not known, but according to unconfirmed reports they intend to raid the Muntafik area.

I have little doubt the R.A.F. will handle this situation with their usual efficiency.

Let us examine the Iraq air administration from the financial point of view. In the first report of the Geddes Committee, it was suggested that air control in Iraq was to save this country fifteen million pounds in the first year. The Committee on National Expenditure, in their first interim Report, issued in 1922, stated that "by the use of aircraft in this region, it has been found possible to reduce the estimates in respect of the Middle East from twenty-seven million pounds to thirteen million pounds in 1922-23.

Thanks to the use of the Air Force, the present figure of defence expenditure is less than a quarter of the second of the two figures mentioned by the Committee in their report.

It is a very moderate estimate for me to say that in the five years the air control in Iraq has been in force it has saved this

¹ Special correspondent, *Morning Post*, 18th January, 1928.

country forty million pounds, equivalent to the total of the present-day Air Estimates for two years, or the cost of the Air Ministry for half a century.

Had there not been an independent Air Ministry and Air Staff, the Iraq experiment would never have been undertaken, since it is common knowledge in official and Parliamentary circles that the then Chief of the Imperial General Staff bitterly opposed the scheme throughout, and advised the Government that it could not succeed.

The reader will naturally ask : Who decided to carry out this original experiment of putting Iraq under air control ? We are told that Mr. Churchill convened a conference at Cairo in the early spring of 1921, and goes there to conduct its deliberations. Colonel Lawrence informs us that Churchill " in a few weeks made straight all the tangle, finding solutions," etc., etc., to defeat the many problems. " Ephesian," in his book,¹ refers to this Cairo visit, during which Colonel Lawrence was Mr. Churchill's most useful adviser, in these words—

Apart from local adjustments and appointments, the essential fact which Churchill accomplishes at Cairo is to release the British Army from Iraq and to substitute for it the Air Force. This idea of governing from the clouds is as successful as it is novel. (The soldiers at the conference and at Whitehall are, of course, solidly against it.) It reduces the annual cost of occupation from forty to five million pounds and less ; it saves the lives of innumerable soldiers ; it gives the Middle East a period of complete tranquillity. All improvements there date from the Cairo conference and subsequent British Governments will not alter any of Churchill's arrangements. It is indeed a notable achievement.

There is little doubt that the air arm can effect economies in our system of national defence. It is cheaper than any other form of defence. Statistics are available to prove this statement is correct. By reason of their great mobility, a few aircraft can perform duties that would require large bodies of troops.

Contrast what has happened in Syria, where the French have superimposed on enormous ground forces a large number of

¹ *Winston Churchill*, by Ephesian, page 222.

squadrons of aeroplanes, a far larger number than we maintain in Iraq.

This means increased expenditure. If the French had given the control of Syria over to an independent air force, I cannot help feeling that they would have saved much money, many valuable lives, and much trouble. At present their air arm is subordinated to the influence of the military staff. I am confident that only with an independent air force can air control function properly.

Our good neighbours will remember the operations we undertook in Somaliland in 1920, where for a cost of about £70,000 (to use the words of the then Secretary of State for the Colonies)¹ a short campaign "achieved much more than we were able to do in one expedition before the War for a cost of £2,500,000, and that would be £6,000,000 or £7,000,000 of the present currency." This brilliant little campaign led to the final extinction of the Mad Mullah.

On 23rd January, 1928, it was stated officially that it had been decided that the responsibility for the defence organization at Aden, the port on the south coast of Arabia, should be transferred from the War Office to the Air Ministry. In accordance with this decision, a Royal Air Force officer was to be appointed in April to assume the command and administration of the troops in the garrison.

There is no doubt that the success that has attended the R.A.F. administration in Iraq is responsible for this decision to set up an air control at Aden. From the point of view of economy and efficiency it is to be hoped that the defence organizations of several other stations abroad will be handed over to the Air Force.

Some of my readers may recollect how Lord Roberts, in his book, *Forty-one Years in India*, described the routes that had to be followed by troops in North-West Frontier operations. These approaches to India from the North consist often of narrow roads, with very difficult country on either side.

¹ *Hansard*, Vol. 125, No. 10, column 1396.

If one considers a hostile force advancing to attack India along these routes, it can be seen how useful aircraft would become, particularly when one recalls Colonel Lawrence's¹ story of how the Turks were caught in Palestine in 1918 in the road that runs along the valley by which Esdraeldon drains to the Jordan by Beisan and a whole army corps was wiped out.

That incident alone shows what an enemy might expect if they attempted operations against us on the North-Western Frontier of India.

Pollen states, on pages xxiii and xxiv of *The Great Delusion*, that the Royal Air Force is "a thrice proved failure" on the Indian Frontier, and alludes to "frightfulness" in this connection.

"Neon," on page 188, gives a typical garbled and unrepresentative quotation from the Supplement to the *London Gazette*, dealing with the operations in Waziristan in 1925.

I have in front of me General Sir Claude Jacob's dispatch, dated 20th November, 1925, and I would draw the reader's attention to Clause 32, which states—

It is difficult to obtain information as to the number of casualties inflicted on the enemy. The tribesman is reluctant to admit that the fighting strength of his tribe has been reduced by the killing of his young men, so his losses are usually concealed. *It is not likely that the actual casualties were many, nor is it desirable that they should be, provided that the enemy can be brought to terms without.*

And Clause 39 says—

This is the first occasion in India that the R.A.F. has been used independently of the Army for dealing with a situation which has got beyond the resources of the political officers. It is at present too early to judge how lasting will be the effect or how permanent will be the impression of this display of air power on the stubborn tribesmen of the North-West Frontier, but it is claimed that the operations prove that in the R.A.F. the Government of India have a weapon which is more economical in men and money and more merciful in its action than other forms of armed force for dealing with the majority of problems which arise beyond the administrative frontier. That they have not been without effect on sections of the Mahsuds who were

¹ Page 103.

not included in the area of operations is shown by a number of settlements which have been effected during the progress of the operations, notably the case of the surrender of the rifles looted from the Gomal Police Post.

It is unwise of "Neon" to have suppressed the passages stressing the small number of the actual casualties and the fact that it is not "desirable that they should be many, provided the enemy can be brought to terms," as also a reference to air power being demonstrably "more merciful in its action than other forms of armed force," *alike to our own side*, an aspect of the matter which "Neon" and Pollen ignore—I suppose they would like to arm our troops with bows and arrows!—and to the enemy, on whom we secure the necessary moral effect by dislocating their day to day life rather than causing actual casualties.

General Sir Claude Jacob naturally prefers, as stated in Clause 4 of his dispatch, that these operations should have been made by a combination of land and air forces. With great respect to the gallant General, may I say the one thing that wrecks air operations is to combine them with large-scale ground operations, for bodies of troops with long columns of supplies in the difficult hilly terrain of the Frontier, give the tribesmen just the opportunities for butchery and loot which they love, and which make warfare worth while, despite the casualties that incidentally result on either side.

I heard privately last year (1927) from high authority in the North-West Frontier Province that the operations carried out in the spring¹ against a revolting section of the Frontier tribesmen had been a complete success, and the Air Force again brought them to heel with a minimum of suffering *completely unaided by ground troops*.

In fact, the air arm has now definitely established that *under suitable conditions* it can secure peace on the North-West Frontier of India far more mercifully and economically than a ground expedition, as in Iraq and Somaliland.

¹ 1927.

Sir Samuel Hoare referred to these air operations in his speech on the 1927-8 air estimates in the House of Commons, and pointed out how very successful these operations had been, as the bombs drove the natives into their huts and the fleas drove them out! The casualties in these operations, I am told, were very small.

May I ask why it is that Pollen concentrates on India, Syria, and Morocco (the explanation of the failure in the last two countries is, of course, that the air has not been used independently, but has been cramped by Army control¹), but omits altogether Iraq, the great outstanding air success?

The Soviet air route between Moscow and Kabul was completed in the autumn of 1927.

This route is Moscow—Kharkov—Tiflis—Baku—Krasnodorsk—Bokhara—Tashkent—Kabul.

At all these places there are efficient aerodromes, with the necessary ground equipment.

As Russian activities in China have failed, we may expect them to reappear on the Frontier of India, and it will be prudent for this country to maintain in India an efficient air organization to counter the Soviet intrigues in the vicinity of Kabul and through Persia to Baluchistan. It is well-known that the Third Internationale desires to create unrest in India, Iraq, and Palestine, with the view of capturing the sympathies of a large part of Islam.

Our air authorities will no doubt be prepared for every eventuality in dealing with these Moscow-hatched plots.

Mr. Amery will recollect that in 1921 Iraq was held by thirty-three regiments of infantry, six cavalry regiments, and sixteen batteries of artillery, a few squadrons of aircraft, and some auxiliary troops.

Now the Royal Air Force controls Iraq with five squadrons of aeroplanes and two battalions, saving us well over ten million pounds a year, and I can inform Mr. Amery that the pioneers of the air movement have had some hand in developing

¹ Page 289.

the air machines that bore him in safety on his long flights in Palestine, Iraq, and Egypt. Now I ask the Colonial Secretary, on his return from his recent Empire tour, to advocate at Cabinet meetings, as opportunity offers, that we should open up more air routes throughout the Empire.

I will give a few examples of where this can be done, and I am certain Mr. Amery, who is a man of strong Imperial views, will press the Air Minister to drive ahead and blaze more trails with this wonderful golden aeroplane key.

Major Hemming writes¹—

My recent journey into the interior of British Guiana has confirmed my belief in the aeroplane as a key to the development of many areas in our Empire which have remained undeveloped in spite of their known wealthy resources, chiefly owing to the natural difficulties of the country.

British Guiana is a typical example. It is our only colony on the mainland of South America ; it has an area of 90,000 square miles,² and a seaboard of 270 miles. The majority of its 297,000 inhabitants live on the coastal area, which is low-lying and possesses rich alluvial soil, very suitable for producing sugar, rice, cocoa, etc. Approximately 77,000 square miles of the colony consist of dense tropical jungle, and in the far interior are the savannah and mountainous regions. It is in the forest that the diamond fields exist, and it is known that the colony's mineral resources³ have hardly been touched at present. Generally speaking, it may be said that in relation to the area the amount of development that has taken place in the interior is negligible. The jungle itself consists of an unknown wealth and tropical timber, and it is said to be the only place in the world where greenheart is found.

Quite apart from the value of the aeroplane for survey and transportation of freight, there is another important benefit that the aeroplane can confer on British Guiana. The coast at Georgetown is actually below the sea-level—it is in fact very similar to Holland—and tropical diseases are prevalent. In the interior beyond the forest area there is wonderful mountainous country, which I am told would make a perfect health resort for the white people on the coast. At the present moment this country cannot be reached except after

¹ *Air League Bulletin*.

² Approximately equal to the area of Great Britain.

³ Gold and bauxite are also found.

weeks of laborious, expensive and very risky travelling, whereas an air service could take business men from the coast to the hills in a two-hours' flight.

Road, railway and air development is required to open up this country, which sailors always call the "Magnificent Province."

In the debate on the Air Estimates last year, I asked the Air Minister to look into the question of a subsidy for connecting up Uganda to Khartoum by air. This he promised to do. When in Egypt in January, I met Sir William Gowers, the very able Governor of Uganda, and he was keen on developing an air service from Kisumu to Khartoum. He told me a seaplane could operate to within 100 miles of Lake Albert. Over this distance the Nile was too difficult for the seaplane to land on the water. Major Cavendish Bentinck, on the Governor's staff, was very much impressed with the value of an efficient air service in those distant parts, and later, Sir Philip Sassoon, Under-Secretary of State for Air, kindly sent me a private letter dealing with the Khartoum-Kisumu air service in April¹ last, from which I extract the following—

This experimental civil aeroplane service is subsidized by the Government of Kenya to the extent of £2,500, by the Government of Uganda to a similar extent, and by the Government of the Sudan to the extent of £2,000. The question of financial assistance for the permanent service, if and when it is established, has not yet however been fully considered.

A well-known business man, Mr. Graham Dawson, who resides in Nairobi,² Kenya Colony, was recently talking with me on the Terrace of the House of Commons, and stated—

Sooner or later in places like East Africa we have *got* to have an air service if the country is to be developed and the present slow and tiring methods of travel are to be speeded up.

Boats arrive from England with goods and no documents sometimes, so that a letter of guarantee has to be obtained from one's bank at a cost of 10s. before such goods can be released. The Kenya banks say that the yearly total so paid amounts to some £10,000.

¹ 1927.

² Mr. J. Graham Dawson, Court Chambers, Nairobi, Kenya Colony.

Mails are not regular either in or out, and given a regular air service between Nairobi and Khartoum (and later Cairo) there is undoubtedly a growing mail business which can be tapped even at 6d. per ounce extra, in addition to passengers. And given this regular service, firms on this side who have business in East Africa would send their documents, drafts, samples, etc., by this route.

You have got to educate the people there in "air-mindedness." We are more open to such education than people in England, for the question of distance and time is one for us to think about, while in England with its small distances, its wonderful roads and railways, flying is not of considerable importance.

I am rather against Kisumu as the Kenya terminus and would sooner make the route Khartoum-Nairobi, a distance at the outside of 1,500 miles, and have aeroplanes, not seaplanes. Both Khartoum and Nairobi have good aerodromes, that at Nairobi is six miles out on a good road and Commodore Samson said it was one of the best he had been on out of England. At Nairobi you have all the amenities of civilization and a good climate. Further, what I think is a great point at present, from the point of view of propaganda or "air-mindedness," if your machines arrive and depart on schedule time, people will get used to seeing their friends arrive and depart, whereas Kisumu is 220 miles away and not 10 per cent of the people have ever visited the place or are ever likely to, and it is from Nairobi that you are going to get the bulk of your passengers and mail business. During the cool season in the Sudan, it might be possible to influence some of the visitors to Khartoum to come on down to Nairobi by air. Another matter which would assist in the success of such a venture, you must have good pilots with known records; take Commodore Samson, for instance (although it would not be possible to obtain him), anyone in East Africa would go up with *him*, or some of the Imperial Airways pilots—there seem to be a round dozen or more of good pilots on this side who could be obtained for a few months in the first instance.

You would want three machines at least for a start, to carry not less than, say, six passengers, their luggage and mail matter and a weekly service both ways. Two landing grounds would have to be made between the two centres and a system of wireless arranged. Make the time of leaving Nairobi and arriving at suitable hours, so that it would not be too much of an effort to get up and see your friends arrive or depart. The present time-table shows hours such as the following: depart Mongalla and Shambe 6 a.m., Khartoum 7 a.m., Kisumu 8 a.m., arrive Mongalla 5.20 p.m., Shambe 5.30 p.m., all unearthly times. Sunset is roughly 6 p.m.

I understand that the country to be covered is not difficult ; there are no high ranges to fly over and, apart from the " sud " regions to the south of Khartoum, the country is fairly level.

A service might be run between Mombasa and Nairobi, either in connection with the proposed route or independent of same. A seaplane service between Mombasa, Tanga, Zanzibar, and Dares-salaam, where there is a good deal of well-paying passengers and mails. A similar service on Lake Victoria between Kisumu, Kampala Jinja, and perhaps Mwanza might be suggested, but on these it would not be possible to touch more than a very slight amount of the through traffic between Nairobi and Europe.

Mrs. Dawson was no less enthusiastic than her husband in advocating a Nairobi-Khartoum air service, and informed me that she had tried to book a passage on her way home by air from Nairobi to Khartoum, but was unable to obtain a machine to take her. That, reader, is a fine spirit, and will help air development. Once our brave women who assist their men in building up this country as a great Empire and great commercial world power, appreciate in full the advantage of air travel, progress will not be slow. That intrepid aeronautette, Mrs. Elliott-Lynn,¹ who takes a delight in making altitude records, gave a very interesting account of her travels by land and water when she was unable to go by air from Khartoum to Kenya, because the float of the seaplane she was to have travelled in to Kisumu had struck a submerged object in the Nile. For twelve days and nights of the journey she had to travel in a small stern-wheeled Nile boat, averaging a speed of four miles an hour.

The journey took three weeks and five days to do, and it can be done by the air in two days !

Mrs. Elliott-Lynn, now Lady Heath, had to make a forced landing in her recent flight from Pretoria to Bulawayo on the way to Cairo, and had to remain some considerable time on the veldt alone. We were all glad to hear she was found by a party of motorists and has reached Cairo in safety.

¹ In an interview with a representative of the *East African Standard* and published in the *Air League Bulletin*.

Miss Auriol Lee¹ possesses the distinction of being the first lady to travel by the new Kisumu-Khartoum air service.

Her flight from Khartoum was started on Sunday morning, and during the course of that day the party proceeded to Malakal, where the first night was spent. On the second day a stop was made for a short time at Shambe, whilst the night was spent at Mongalla. The following day the machine proceeded to Jinja, where a stop was made. From Jinja to Entebbe Miss Lee travelled by car. After spending the night at Entebbe, the flight was continued to Kisumu, which was reached at about 11.30 a.m. on Thursday.

Miss Lee described the journey as one full of thrills and interest. From the flying point of view—and Miss Lee is qualified to speak, having flown during the last few years with many of the world's most celebrated airmen—she considers that the route will present but few difficulties, and particularly so when the new machines, which are being constructed, are completed. There are two stretches of rapids, at both of which it would be impossible to land, but otherwise there is good landing accommodation all the way. There are miles of forest and sudd which are flown over.

Amongst the incidents of the journey, she spoke of flying at 100 ft. over a large herd of elephants. Hippo were several times startled and slid smoothly away into the water, whilst crocodiles were seen at Jinja.

At times during the flight the machine flew at 5,000 ft., and it was while flying at that height, when only a short distance from Kisumu, that they shot upwards quite unexpectedly! It was explained to Miss Lee that they were being pushed upwards on a rising current of air from Lake Victoria.

The time taken over the journey was only about eighteen flying hours, but they were crowded throughout with interest and enjoyment. To use Miss Lee's own words: "I enjoyed every minute of it from the time we left until the time we arrived at Kisumu."

¹ *Air League Bulletin*, July, 1927.

Miss Lee is to be warmly congratulated on being the first woman to take this trip.

In Canada aeroplanes are playing an important part in the life of the country in such work as searching for seal schools for the sealing fleet, patrol of the Hudson Straits to determine sea conditions. Valuable work has been done for fishing protection along the Pacific Coast, and we are informed much illegal fishing has been prevented. Aerial survey work is in great request, not only for map revision, but also for determining water-power possibilities. Engineering parties are now transported by air with much success.

More than 165,000,000 acres of forest are now under air protection. Early warning can be given of fires and men and appliances rushed to the danger zone.

Seventy thousand square miles of forest land were photographed last year, giving great assistance to the Forestry Commissioners by supplying information concerning the different kinds of timber to be found.

Mining camps cut off from civilization, which formerly received but occasional mails by means of dog sleighs, are now in regular receipt of news from the outside world.

Insect pests, which have ravaged thousands of acres of fruit trees, have also been checked by means of spraying the trees from the air.

At Calgary, on 13th August, in saying "au revoir" to the Prince of Wales, where he had been the guest at his ranch, and in replying to civic addresses of welcome, Mr. Baldwin said—

Canada was capable of supporting tens of millions of population. In the Mother Country there were millions of willing hands. I want to bring the empty spaces and the willing hands together.

May I submit to the Prime Minister that in his endeavour to populate the vacant spaces of our great Empire, the airmen can help by establishing commercial air routes for speedy travel and transport. This will get rid of that loneliness and long, monotonous hours in the fields, that Mr. Baldwin referred

to when they know that in a few hours by air they can reach a centre where a large number of men and women congregate and live.

In May, 1927, the whole question of the development of Colonial territories by means of air transport was discussed at the Colonial Conference at the Colonial Office.

The Secretary of State for Air, Sir Samuel Hoare, in opening the discussion, said that his remarks might be treated as comments upon those parts of "An Approach towards a System of Imperial Communications," which affected the Crown Colonies and Dependencies.

He went on to say that the Imperial Conference of 1926 had agreed that the speeding-up of Imperial communications by air was a great benefit to the Empire, long distance aeroplane routes must be built on a co-operative system with each part of the Empire taking its share of the organization, and that the development of airships had great potentialities for the long-distance air services.

Our flying policy must be an Imperial policy, needing the help of the Colonies as much as the co-operation of the Dependencies. He imagined that the Representatives of the Imperial territories would ask themselves first how far the development of aviation would benefit their respective countries, and, secondly, to what extent their revenues could stand the charge.

Although the Imperial Government was ready to give financial support to long-distance lines, it was not prepared to undertake the regular subsidy of internal services, and therefore had no right to dictate a flying policy to the Colonial Governments. Regular air services still required substantial subsidies for their support. British policy was intended to make civil aviation self-supporting at the earliest possible moment and to give Imperial Airways every incentive to free itself from dependence upon subsidies. The new types of machines used by Imperial Airways had reduced the running cost per ton mile from 4s. 2d. to 1s. 10d.

He suggested that the Colonies should economize not only in the field of technical development, but by making their aircraft instruments for many kinds of work. The aeroplane had already proved an effective and economical instrument for forest survey, and in spraying insecticides over diseased crops. It had conferred benefit upon remote settlements by bringing doctors and teachers within the reach of scattered families. It had been suggested as a quick and economical means of locating oyster beds.

An aeroplane service between Cairo and Nairobi would halve the four weeks it takes to travel from London to Nairobi.

He hoped that the Government of the Straits Settlements would watch the developments of the Imperial Air Route to India with a view to utilizing the cardinal position of Singapore as an air junction between Europe, India, and Australia.

The sooner landing grounds were obtained and prepared, the cheaper it would be for the Governments concerned.

He was particularly interested in the move that was being made by certain of the African Governments for forming a common meteorological service. Weather forecasting was essential to safe flying and useful in agriculture.

In my judgment, Australia and many parts of Africa have an enormous future before them, and in that future airmen can play a great part in bringing inaccessible places in the interior in closer touch with the centres of civilization. Australia is forging ahead.

Sir Granville Ryrie, speaking in November, 1927, said that if there should be another war, aviation would play an important part. To say that there would not be another war, and that, therefore, it was not necessary to go on improving our airships and aeroplanes, was ridiculous. It was necessary, and it would be suicidal if we did not go on as other nations were in improving our air service. Australia now had 5,000 miles of air routes and another 5,000 miles of routes were in course of survey. The mileage covered last year was 540,000, and nearly 11,000 passengers were carried. The Australian

Government had just given another £200,000 subsidy for the air service this year, making £400,000 altogether.

Our people must not run away with the idea that we are behind any other nation in aeronautical development. On the contrary, we have the finest air industry in the world—good designers, good constructors, good engineers, and most efficient pilots.

All they want is encouragement and not “crabbing criticisms” if we want to advance British flying.

Young America is being air inspired. Chamberlin, the gallant transatlantic flyer, tells us in an interview¹ that—

In the United States to-day, most of the big things in flying are being done by young men. The majority of the war pilots have drifted into other business, and a newer generation is taking their place. These young men have had almost unrestricted opportunities of taking up flying compared with Europe. Many, after five to ten hours' flying lessons at a commercial flying school, costing only 200 to 300 dollars, have been allowed to buy their own machines and even take up passengers. They have not been hampered by the severe restrictions which are imposed on this side of the Atlantic. The result is that in the States to-day there are at least 5,000 privately-owned planes, of a type which can be built cheaply and reliably, and the young men are inspired with the ambition to do big things.

We must inspire our young airmen a little more and let them see that their good efforts are appreciated. In the past we have led the way in steamship travel and transport of goods by sea. We are the great ocean carriers of the world. We have developed road and rail travel to a very high state of efficiency, which compares favourably with any other country. Then why should not we be in the forefront in developing air travel and air transport?

If we do not forge ahead, other countries will seize the opportunities we neglect and our prestige throughout the world as a progressive nation will suffer.

In pressing for an Empire air policy from the biggest possible point of view, I am glad to be able to record that we shall now

¹ *Observer*, 10th July, 1927.

have the support of a very able airman, who has recently been appointed Secretary-General of the Air League. That body could not have made a better selection than Brigadier-General Groves. He is a live wire, full out for air development, and is entering upon his new duties at a time when the importance of aviation to the Empire, not only for defence but in commercial, political and administrative matters, was never greater.

In this country we have an Empire Air League membership of 6,000, whereas in France and Germany organizations of a similar nature number millions. Even in Russia, we are told, three million members are interested in the air movement. Over 6,000 people turned out recently on one Sunday afternoon outside Hertford to see a little flying. Many people are interested in air development—they only want encouraging. General Groves has a fine field and a unique opportunity in pressing that we develop air routes all over our Empire and take a hand in developing the air routes of the world.

In my humble judgment, we want air leagues established throughout the Empire, and I notice that as a result of Sir Samuel Hoare's flight to India, and Air Vice-Marshal Sir Sefton Brannock's recent speech at Karachi, leading residents in that town have founded "The Air League in India," with the following objects—

1. Public interest in aviation in every possible way.
2. The fullest development of civil aviation in India.
3. The opening of air services between the chief towns and ports of India and between India and other countries.
4. The provision of more aerodromes, airship stations, seaplane bases, and other necessary equipment and organization.
5. The development of the aircraft industry in India as far as possible with Indian capital.

I submit to the reader that those who "crab" the air work of our fine pilots from a large arm-chair in a Whitehall building possess either limited brain capacity or they have a warped brain and are confused thinkers. All clear thinkers in this

country now know that we want a forward air policy for the whole Empire and the airmen mean to press for one.

We know the air can help enormously in the opening-up of new lands with their new markets, and also that the Imperial tie can be strengthened by this means.

“Neon” would have us run away from air development. Does “Neon” or Pollen think the formation of our world-wide Empire was built on “funk”? It was not built up by men of small brains or of faint heart. Stout-hearted, big-brained, strong-handed men, with considerable moral and physical courage, were always available to face dangers and hardships that beset the path of the early pioneer from the Elizabethan days onwards. The urgent need is to lay down an Imperial air policy, and it is to be hoped that in the near future an Imperial Air Conference may be convened to consider how air links of Empire, with aeroplanes, seaplanes or airships, can best be forged, and how meteorological stations can be established at certain important places to collect the data for use in air travel all over the British Empire.

CHAPTER XII

CIVIL AVIATION

There be three things that make a country great and prosperous—fertile soil, busy workshops, and an easy conveyance of men and commodities from one place to another.

BACON.

THE latest report on civil aviation in this country in 1926 shows a considerable increase in passenger traffic, and for a second year running there have been no casualties. Fifty-two thousand passengers have now been carried, and 2,500,000 miles have been flown without injury to any passenger.

This should encourage passengers to have greater confidence in air travel, particularly by the Imperial Airways, which under Sir Eric Geddes's good and wise guidance is establishing a high reputation for efficiency.

The great growth of air travel throughout the world is a fitting answer to those critics who are out to prove that the air movement is a complete failure and who show such open hostility to the new way of travel. That civilization will benefit by the development of the air only the Noahs doubt.

The Imperial Airways Directors' report for the year ending 31st March, 1927, reveals that for the first time the Company declares a profit. This improvement is almost entirely accounted for by the success of the European section of the air lines. The first three months of the Middle East service are said to have brought only a small profit.

Traffic on the regular European services has increased by 26 per cent, compared with the previous year, and trading revenue for these services has increased by 39 per cent.

Also it is interesting to record that since 1922 running costs per ton mile have been brought down from 4s. 2d. to 1s. 10d.

Eight years ago a D.H. Rolls-Royce converted warplane

made its maiden flight between London and Paris. This machine had accommodation for only two passengers. Its single Rolls-Royce engine developed 365 h.p., or 182 h.p. per passenger. To-day, the latest triple-engined Silver Wing de Luxe air liners of Imperial Airways carry 20 passengers, with a horse-power of 1,200, or less than 60 h.p. per passenger. Now the Imperial Airways, every day, conveys a constant stream of passengers, mails, and goods of great value to Cologne, Brussels, Paris, etc.

This is a fine achievement, and it is to be hoped that the Imperial Airways will spread their tentacles still farther and extend their sphere of influence.

Those who caused the conception of "Neon" will, no doubt, remember the first motor-car run to Brighton and the broken-down cars that lined the roadside in that historical test, and that very few people then believed in the motor-car as being a sound commercial proposition. Will they say that Major Segrave's wonderful record of speed on Daytona Beach in 1927, in which his car reached the great speed of 203·841 miles per hour, which was some 29 miles per hour faster than Captain Campbell's previous record on Pendine Sands, and Captain Campbell's great achievement this year in beating Major Segrave's record by advancing it to 207 miles per hour, was obtained by running away from all motor-car work? Yet "Neon" advocates that Britishers should run away from air development. None but a faint-hearted fool would block air progress.

Nobody can accuse our Bishops of being too progressive, for did not the Archbishop of York, in his inspiring address to over two hundred Members of Parliament, say to us that it had taken his colleagues 20 years to revise the Prayer Book, and they had now included a prayer for those who travel by land, air and sea.

Air travel must indeed be advancing, when those who take to the air are likely to be included in the prayers of our Church, and since this has been suggested I notice a Bishop now flying

to fulfil his promises, for on Sunday, 10th July of last year,¹ the Right Rev. Richard Thomas, Bishop of Willochra, South Australia, flew nearly 200 miles, from London to Manchester, to keep his clerical engagements. In the morning he preached at St. Cuthbert's Church, Philbeach Gardens, Kensington, S.W. In the afternoon he took part in a religious procession at Gorton, Manchester, and preached at the Church of Our Lady and St. Thomas there in the evening.

I hope other clerics will now follow this good Bishop's example, for I can imagine nothing more inspiring or more exhilarating for a clergyman in the execution of his high office than to fly from one church to another, and I feel his sermons would animate his congregation greatly if they knew he had just arrived by air.

Although the composite Prayer Book may have to be altered in view of the recent voting in the House of Commons, I fear the inspirers of "Neon," with Pollen's good help, will have a colossal task before them in persuading the Bishops to delete the prayer for those who travel by the air from the New Prayer Book, whatever form it may eventually take. Even the Bishop of Norwich, who seemed a very kindly cleric when he spoke to many Members of Parliament giving his reasons for opposing the composite book, would, I feel certain, not deny a simple prayer for those who are air travellers.

Surely "Neon" will be most interested in two fine flights that have recently been made by the Duchess of Bedford, who is now becoming an experienced air traveller. Her first was a 5,500 miles flight, and was described by the aeronautical correspondent of the *Morning Post* as follows—

The Duchess with her pilot in a Moth aeroplane flew from her place, Woburn Abbey, to Paris, Biarritz, Madrid, Seville, Tangiers, Toulouse, Lyons, Paris, and London. She has crossed three ranges of mountains, the Pyrenees, the Guadaramas, and the Sierra Nevada.

"I went for the scenery alone," the Duchess of Bedford continued, "and that has been wonderful beyond description. As you

¹ 1927.

see, the little Moth has returned without a scratch—and the same may be said of its passenger.

"There is none of the dust, dirt, and fatigue of ordinary travel, and I return as fresh as when I started. When you look at one of these little machines standing on the ground it seems marvellous that it can carry two people on a long tour like ours."

The Duchess of Bedford, who is in her sixty-second year, is an enthusiastic air traveller. She enjoys not only straight flying, but also aerobatics. Before landing at Stag Lane yesterday her pilot put the machine into a spin and executed some steep Immelman turns.

Again, in August,¹ she made a really fine air tour, perhaps the most remarkable ever made by a woman, and I trust she will not mind me alluding to it, as I think, in these early days of air travel, for a lady of her years to take to the air in so sporting a fashion justifies that it should be carefully recorded.

In this second flight the Duchess was piloted by Captain C. D. Barnard in her own Moth light aeroplane, and covered 3,500 miles in just over a week, crossed the Alps at a height of 14,000 ft., saw the Riviera fires from the air, and was caught in terrific air disturbances in the region of a water-spout.

"I thought that my travelling days were over," the Duchess of Bedford remarked after landing at Stag Lane aerodrome yesterday, "but now that the light aeroplane has come I realize that they have only just begun."

The Duchess was enthusiastic about air travel. She described it as a complete release from all the anxieties inseparable from travel by land or sea. The weather, although bad in places, had not made them alter their programme.

She set out for the tour as a holiday, and also because she wanted to see the Lido, which she had never before visited. The route was Stag Lane to Paris, and thence over the Alps to Turin, Milan, Verona, and the Lido.

At the Lido the Duchess of Bedford was able to appreciate the sun without having to bother about times of trains or the safe dispatch of luggage. Her Moth was always ready to carry her with her luggage to Rome in a few hours.

It was while flying along the coast near Naples that the aeroplane passed close to the water-spout. "You could see the water being literally sucked up from the sea," said Captain Barnard. "The 'bumps' were appalling; I have never known worse."

¹ 1927.



THE YOUNGEST AIRWOMAN

Miss Honor Pitman, granddaughter of the late Sir Isaac Pitman, who obtained her pilot's certificate at the age of 15

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The Duchess of Bedford is a good sailor and the bumps did not cause her any discomfort. She was much impressed by the Riviera fires, and was able to watch the people running from their houses.

The route home was via Nice and Paris.

This is the second long Continental air tour which the Duchess has undertaken and the first one in her own aeroplane. No work of any kind was done to the machine for 3,500 miles. This is a record which cars costing twice the price of a light aeroplane cannot approach.¹

All airmen were delighted to see the high honour bestowed upon the Duchess in the New Year's Honours List,² and hope she will enjoy flying for many, many more years.

Another good sportsman to enjoy air travel is Sir John Rhodes; he has followed the Duchess of Bedford's example, and takes his holidays flitting about in a Moth aeroplane.

His first week was spent in the air, with the exception of one day's stay at Avignon. He reached Dijon the first evening, having flown 414 miles the first day. From there he flew south to Avignon, and then north again to Paris. He visited Brussels and Ostend, where he remained a fortnight before returning by air to Croydon. Altogether, Sir John covered 1,548 miles, with an expenditure of £14 6s. 5d., and the cost worked out at a little under 2½d. per mile, which does not compare unfavourably with the corresponding cost by rail or car.

A good many important people are now taking to flying, for I notice that the Lord Mayor of Norwich is decidedly more progressive than the Bishop of that distinguished city, and claims to be the first Lord Mayor to use an aeroplane for his civic duties. He flew to Raynham Park, Fakenham, the seat of the Marchioness Townshend,³ about 35 miles from Norwich, to attend an aerial fete.

It is interesting to record that Miss Honor Pitman took her pilot's certificate at the age of fifteen. Well done, Miss Honor. (Plate 55A.) We may hope many young women will follow her good example.

¹ From the *Morning Post*, 19th August, 1927. ² 1928.

³ The Marchioness Townshend during the Great War was one of our best recruiting assistants for the Naval Air Service.

The Moths are doing exceedingly well, for I am glad to be able to write that, on 24th August, 1927, Captain H. S. Broad, flying a Tiger Moth aeroplane, D.H. engine, 130 h.p., covered 100 kilometres at the great speed of 186.5 miles per hour, and reached 20,000 ft. in 17 minutes when flying over the Wembley area. This is a world record for light aeroplanes weighing between 441 lb. and 770 lb. The Tiger Moth is a monoplane of 22 ft. span, designed by Captain de Havilland, and the D.H. engine, probably the most remarkable and powerful light aeroplane engine of its size in the world, was designed by Major Halford, the well-known racing motorist.

We have been lagging a little behind in world air records of late, so Captain Broad's fine feat will be welcome to many who want to see this country take the lead in aeronautical development.

The Paris correspondent of the *Daily Mail* informs us, in the issue of 19th January, 1928, that—

For the first time on record the title of Champion Airwoman of the World has been awarded by the Committee of the International League of Aviators. Lady Bailey, wife of Sir Abe Bailey, the South African millionaire, has been singled out for this honour, and will receive the Women's International Aviation Trophy.

Lady Bailey took her pilot's certificate in 1926. Last July she achieved the world's altitude record for light aeroplanes at Stag Lane aerodrome, reaching a height of 18,000 ft. after passing through a layer of thunder-clouds. She had as passenger Mrs. Geoffrey de Havilland, wife of the designer of the Moth light aeroplane. Lady Bailey was the first woman to fly the Irish Sea alone, a feat which she accomplished in August, 1927.

All those who are interested in the air must be pleased that light aeroplane flying is developing strongly in every part of the country. Several new clubs are being organized, and the number of private owners is multiplying at an encouraging rate. On a recent Saturday (16th July, 1927) three meetings were held simultaneously in different parts of the country and were well attended.

Sufficient experience has now been gained to enable a prospective owner-pilot to estimate his expenses with reasonable

accuracy, and to see the truth of the claim that a light aeroplane can be run at a cost per mile no greater, or even smaller, than that of a car. The *D.H. Gazette*, issued by the De Havilland Co., makers of the Moth machine, has a most interesting article on "The £ s. d. of Private Flying." It is shown that even after taking into account insurance, petrol and oil, maintenance costs, garage rent, etc., a Moth owner can cover 20,000 miles per annum at a cost of only about 3½d. per mile, or, if flying is restricted to 12,000 miles, at a cost of slightly over 4d. per mile.

The subsidy to light aeroplane clubs is being renewed on 1st August on a new basis.

At the start the Air Ministry gave equipment and a grant of money to six approved clubs,¹ but in future the number will not be limited to the original six, and the sum received will, in effect, be that earned by the club through its efficiency in training pilots and the subsequent keenness of those men to fly. Thus the approved club will earn £50 for each new pilot trained by the club who qualifies for either Licence "A" (private owner's ticket) or Licence "B" (commercial). Thirty shillings an hour will be paid to a club for every hour's flying by pilots of the club up to a maximum of 20 hours' flying per year by each pilot; and, in addition, a bonus of £10 will be payable for each member who held a pilot's licence current on the previous 31st December.²

It is worth noting how France, Italy, and Germany are pressing forward with civil aviation.

An interesting experiment was made last year by an American traveller, who conceived the idea of testing for himself every possible air line, and it is believed that he has now travelled on most of the recognized air lines in the world except that of Western Australia. Major Lester D. Gardner, a Director of the Aeronautical Chamber of Commerce in America, and an enthusiast for Aviation, spent his holiday in Europe and

¹ This has now been extended to four additional light aeroplane clubs.

² Extract from the *R.U.S.I. Journal* of 1927.

deliberately set out to see for himself the modern possibilities in aerial excursions.

The result has been an unparalleled achievement. In 53 flying days he covered over 21,000 miles, visited 27 countries, and all the principal capitals in Europe, Northern Africa and Iraq. For large parts of the journey he was accompanied by Mrs. Gardner, and the journeys were made with, if anything, less preparation than would have been done for the equivalent journey by rail.

We learn that the whole of these journeys were done without untoward incident of any kind. He did not experience a single engine failure. The flights were all carried out to schedule, and if he was ever late at his destination it was by no more than was likely to happen when travelling by rail or other means.

The journey proved a most interesting example of the possibilities of air travel, and gives some indication of how our ideas of space and time will be altered in a few years. On three consecutive nights, Major Gardner dined in Moscow, in Berlin, and in London. He has flown on practically every type of machine and engine and with 65 pilots of 12 different nationalities. The average speed of his travelling was over 90 miles per hour.

A luncheon was given to Major Gardner by the Society of Aircraft Constructors to commemorate this great flying feat, and being one of the guests, I listened to Major Gardner giving a most interesting and illuminating account of his travels. The outstanding fact was that he had come to England as an ordinary American tourist, set out on his journey, and accomplished it with greater ease than could have been done by any other means. He spent just over 230 hours in the air, and his time on board trains alone would have been over 900 hours. Travelling in the air was pleasanter than would have been experienced on railways, at least on some of the Continental lines. All kinds of weather were experienced, from storms to dense fog, but nothing seriously interrupted his steady scheduled journey. His travels took him from Stockholm to

Casablanca in Africa, Constantinople to London, and Palermo to Warsaw. He has flown over Jerusalem, Babylon, Nineveh, and fourteen Pyramids in the Libyan Desert.

Major Gardner gained considerable experience with British aircraft, and even more with British engines, as many of the Continental lines are supplied by such British firms as Rolls-Royce, Napier, Armstrong-Whitworth, and the Bristol Co. He flew in many types of British machines, including the Handley-Pages and De Havillands of Imperial Airways, and the giant Vickers machines on the Eastern routes. He expressed the greatest satisfaction with British material, which he said would give any air traveller the utmost confidence. We do not appreciate in this country how many of the Continental air lines depend on British motors for their regular running.

It is generally recognized in aeronautical circles that Major Gardner conferred considerable benefit on aviation in general as the result of his experiment, and he is a living example of what an air traveller can do.

In these days, when accidents both in the air and by rail or road provide news items from time to time, the steady forward progress of aerial transport is inclined to be overlooked, and it is only when a feat of this kind is carried out that the public get an idea of the ever-increasing safety and comfort of flying, and it is certain that as facilities for aerial travel are increasing almost daily, the public confidence in the aeroplane as a means of transport will steadily increase, and all those waiting for the aerial age to arrive will awake to find that it has quietly arrived before they have realized its coming.

Another very distinguished air traveller is the Comte de la Vaulx,¹ President of the Fédération Aéronautique

¹ A year ago the Comte de la Vaulx made a tour of 14,000 kilometres in an aeroplane in Africa. When America entered the War he was assigned to the staff of General Pershing, co-operating with General Mitchell in helping to organize the American Air Service at the Front. He founded the International Aeronautical Federation and became its President on the death of Prince Roland Bonaparte, and has for many years been one of the leading air enthusiasts in France; few people have done more for aeronautics than he has.

Internationale, the membership of which covers twenty-seven countries, who recently completed an aerial tour of Europe, in the course of which he flew 8,500 miles in twenty-six different machines with pilots of seventeen nations, at an average speed for the whole distance of 83 miles an hour. In an account of his experiences, which he has contributed to the *Journal*, he says that they exceeded his most optimistic expectations, and threw a new light upon the progress of aviation in Europe. He sometimes took to military machines for special journeys, but with one exception—in Portugal—he could have made the whole tour, had he chosen to do so, by means of the regular commercial air lines.

Comte de la Vaulx left Toulouse on 3rd May in a passenger machine belonging to the Latécoère Co., and dined at Tangier the same evening. On 6th May the same machine took him to Lisbon. From there he went to Madrid by train; there is no commercial aviation in Portugal and he was refused permission to use a military aeroplane. His train was derailed, and he arrived in Madrid twelve hours late. This was the only delay which he suffered on his tour, and I should like to draw the special attention of "Neon" to this mishap and ask if we should run away from train travel because an engine or maybe a coach runs off the line?

Comte de la Vaulx then went in a Spanish commercial machine to Rome, where he arrived in two days via Barcelona and Marseilles. On 14th May, he flew to Belgrade in an Italian Army aeroplane. A Serbian Army aeroplane then carried him to Bucharest, and from there a Rumanian Army aeroplane took him to Budapest. He went on in a Hungarian commercial machine to Vienna. All these flights were made without a breakdown.

From Vienna, Comte de la Vaulx was in the hands of the German air lines. He flew successively to Munich, Zürich, Geneva, and Basle and back, via Zürich and Munich to Prague, where he saw all-metal aeroplanes under construction by the Skoda Co., and a special motor road, six miles long, which is being built

from Prague to its terminal aerodrome solely for the use of air passengers.

Our air authorities might well draw the attention of the Minister of Transport to this convenience for those who travel by air. The roads to Hendon are a perfect disgrace to any civilized community, and quite spoil the Air Pageant.

The Count's next halt was in Berlin. He visited the Junkers works at Dessau and saw great all-metal machines, fitted with sleeping berths, under construction. A German aeroplane afterwards carried him to Stettin and to Stockholm. After visiting Helsingfors, Oslo, and Copenhagen, in Finnish and Norwegian aeroplanes he reached Paris via London and Brussels on 17th July.

Comte de la Vaulx found that in the great majority of European countries aviation had the active interest and support of Governments. He was particularly struck by the energy and progress shown in Germany. Not only did air lines cover every part of the country itself, but machines were being built which were evidently meant to travel into the remotest corners of Europe and Asia. In two years, he prophesies, German "super-aeroplanes" will carry their passengers to the gates of Peking.

Commercial aviation from the Balkans to the Baltic is in the hands of German enterprise. Services are regular, aerodromes are easily accessible, and people think no more in Germany of boarding an aeroplane than of getting into an omnibus. German commercial aeroplanes have only one serious rival—the Dutch Fokker, which plies on certain Western European lines. Money is abundant, as towns and States contribute sums in excess of the Government subsidy. Comte de la Vaulx saw only one organization—Imperial Airways—which could be compared with the Lufthansa, and that on a much smaller scale. The light aeroplane clubs in England were the only approach to the systematic German propaganda.

The French have developed a considerable number of air lines and are gradually overcoming international difficulties in running a regular service between Paris and Bucharest, Paris

to Warsaw. Marseilles, with Toulouse, is connected to many places in Northern Africa, such as Tangiers, Oran, Rahat, Casablanca. A service connects Algiers with Biskra and another connects Antibes with Ajaccio in Corsica.

Having served in Italy during the War, I know the very great difficulties of civil aviation in that country. The Italian air services are badly handicapped by the geographical formation of their country in having high mountains. The Alps are useful barriers in war time, but they add to the difficulties of flying. Good pilots can cross the Alps in about 275 days of the year. In the vicinity of the mountains, winds of high velocity quickly arise. I have been in the Adriatic many times in a dead calm, when suddenly the sea is whipped up and half a gale is blowing in a few minutes. The Italian aviators are an exceptional body of keen men. They kept up the anti-submarine patrols in the Adriatic during the War with airships, aeroplanes and seaplanes in an exemplary manner. Many lost their lives, and their splendid example should inspire the great youth of Italy to develop civil aviation.

The Under-Secretary of State for Air in Italy is now General Italo Balbo, who recently flew his own machine from Rome to this country. I met him at a luncheon given by our very much esteemed Italian Ambassador, His Excellency Signor Antonio Chiaramonte Bordonaro, in his honour. He is a comparatively young man of not much more than thirty years of age; which shows how Signor Mussolini wisely puts youth at the helm, full of energy, and a great believer in air future.

At another function given to welcome Italy's air representative, the Air Minister, Sir Samuel Hoare, in proposing the health of "Our Guest," and of "Italian Aviation," said—

General Balbo represents Italian aviation as well as his country generally, a country which is not only an ally but a friend. May that friendship ever continue. Mussolini, one of the greatest statesmen of modern times, has had the foresight to give the greatest stimulus to the development of aviation, and the Air Force in Italy has been organized on lines similar to those in Britain.

In May, 1927, General Balbo¹ made a tour of inspection of Italian aerodromes and seaplane bases in the Eastern Mediterranean and North African Colonies, the route being Rome—Leros—Rhodes—Tobruk—Benghazi—Tripoli—Rome.

From Tobruk, Benghazi and Tripoli, he visited various aerodromes, making the journeys by air in Caproni Ca. 3 machines. The expedition consisted of a Savoia 55 seaplane, carrying General Balbo and two other officers as passengers, two pilots, and two mechanics, and a Dornier Wal seaplane, carrying three officers as passengers, two pilots, and two mechanics. Each aircraft also carried a wireless telegraph operator during the first part of the tour. The tour occupied fourteen days, and 4,400 miles were travelled by air, the flying time being forty-eight hours.

The Air Minister is quite correct in saying Signor Mussolini is a great believer in the air, and he is giving, by his wise administration, new life to Italian aviation by encouraging in every possible way those who are devoting their energies to air enterprise. Service men are getting rapid advancement and commercial aviation is receiving every encouragement. Italy has some fine flyers. Major Bernardi, the winner of the Schneider Cup in 1926, is a great airman, and now holds the world's flying record in 1928 of 318.6 m.p.h. Commander Ferrari flew from Rome to Tokio in 1920. A law has recently been passed in Italy obliging each region to provide a landing-ground at its own expense, which will gradually build up a network of aerodromes.

They are rich in lakes, and that gallant airman, the Marchese de Pinedo, after his great flight round the Atlantic, will no doubt influence his countrymen to devote a good deal of attention to developing seaplanes.

Signor Mussolini fully recognizes, as indicated in his very able speeches, that Italy is particularly vulnerable by air from adjoining countries, and the best preparation for the defence of her 2,500 miles of open coast and the large factories in the

¹ From *R.U.S.I. Journal*, July, 1927.

north is to have a really efficient civil air service, to reinforce the "Regia Aeronautica" should necessity ever arise.

At the present time Italy runs air services between Turin and Trieste Brindisi-Constantinople, which I am informed by an air traveller are most efficient, and assists with the running of the Vienna-Venice-Rome air route, Genoa to Barcelona, Genoa to Rome, Naples and Brindisi. A Rome-Rhodes-Palestine route may in the near future be developed, whilst services between Scutari and Valona, also Rome and Tirano, are all being considered.

The Italian engineers are possessed of great technical ability. They probably lead the world in small airship construction, and their skill in aeroplane work is shown in the fine machines they produce.

Signor Bellanca, a son of Italy, is the designer of Lindbergh's and Chamberlin's monoplanes that attained such wonderful successes in their transatlantic flights.

Belgium runs an air service, Rotterdam-Brussels-Strasbourg-Basle, and is developing an air route in the Congo between Kinshasa and Bukama. This extends over 1,000 miles, and is linked up by a chain of aerodromes in jungles and swamps of the Congo.

I visited Berlin for the first time in 1912 with Colonel O'Gorman, when he was Superintendent of the Farnborough Aircraft Factory, and no man could have had a more charming companion. Thanks to Major Von Tschudi's great kindness, we were shown all the most modern machines at that time in the Johannisthal aerodrome, just outside Berlin. Major Von Tschudi is one of the greatest pioneer airmen in Germany, an exceedingly able man, and he has organized for many years all the chief aerial programmes for that city.

On 24th March of this year¹ Major Martin Wronsky, the political director of one of the largest air transport combines in the world, Luft Hansa,² read a paper on air traffic in Germany before our Royal Aeronautical Society, in which he

¹ 1927.

² This combine has a capital of 25 million gold marks.

stated that in his country during the summer of last year 54 lines were operated and 15 foreign and 57 inland air ports reached. The daily air mileage flown was equivalent to once round the earth, and in the winter was 40 per cent of the summer total, and comprised 10 foreign and 23 inland ports. There had been an increase of 24 per cent in the miles flown over those flown in 1925. The passenger traffic had increased about 50·3 per cent, the mail by 86·4 per cent, and the total figures for the year were 56,268 passengers, 384 tons of luggage, 260 tons of freight, and 300 tons of mail. The regularity of the summer service was generally not under 90 per cent, and on a great number of lines 100 per cent regularity was achieved. Only one accident with fatal results to passengers had to be recorded in 1926.

On being asked the reason why German states and cities subscribed considerable sums to the Luft Hansa, Major Wronsky said they were jealous of one another, and the only secret lay in making them jealous enough. In other words, it is a matter of promoting and fostering a spirit of competition. This combine is backed by the German Government, the leading banks, great commercial houses, and the chief cities.

The Luft Hansa's summer service for 1927 includes nearly 80 lines compared with 54 last year.

This increase is accounted for partly by the addition of a number of seasonal lines to German watering places and partly by the new international lines.

The editor of the *Spectator*, who has recently returned from a visit to Germany, states in an article which appeared in the *Spectator* of 5th November,¹ that since last year the air traffic on the German system has increased by 200 per cent in passenger carriage and by 500 per cent in freight transport.

Germany largely controls the air routes—Berlin-Amsterdam, Berlin - Königsberg - Helsingfors, Berlin - Moscow - Amsterdam - Hamburg, Copenhagen, Geneva - Munich - Frankfurt - Vienna - Budapest. There is no doubt that the efficiency and capable

¹ 1927.

administration of the German air lines is tending to make them extend, and Count de la Vaulx prophesies that in two years' time German super-aeroplanes will carry their passengers to the gates of Pekin.

Many times I had to visit Berlin in connection with the building and trials of the Parseval airship that was being constructed at Bitterfeldt to the order of the British Admiralty. In talking with all the many different people I came in contact with, I was struck with the extraordinary interest the German people of all classes took in air matters, particularly airships. Everybody in the country districts used to stop their work and seize the nearest thing they could lay their hands on to wave at a passing Zeppelin airship. From the air I have seen hundreds of Germans doing this. If we could only get our people to take as much interest in air matters as they do in the Derby, our progress in air development would soon be rapid. The Germans now hold many records, such as for long distance, and one of their pilots, Hans Loose, has broken the world's record for seaplanes by covering 1,072 kilometres¹ in 14 hours with a load of 1,000 lb.

Leaving Europe and visiting the United States, we find one of the most efficient air services in the world, the Transatlantic Air Mail, running from New York to San Francisco and from San Francisco to New York. Many millions of miles are now flown annually on this service. They carry few passengers, but fly day and night, the landing grounds are provided at short distances, and by night are most efficiently illuminated, and a high American authority in this country informs me that there are few days in the year when this service does not function. It has been in operation for two years, and feeder lines now run to Seattle, Victoria, B.C., New Orleans-Pilotown (Louisiana), Key West (Havana), Cleveland and Detroit, Nenana to Fair Banks (Alaska), and probably many more are now under consideration. The tendency in the United States is to encourage private enterprise for all these services. The contracts are

¹ About 1,064 miles. *[Wrong!]*

placed out to tender, and are competed for in the usual way.

In July of last year¹ the trustees of the Daniel Guggenheim Fund for the promotion of aeronautics announced that an agreement had been reached upon the plan for encouraging the operation of passenger air lines in the United States, through the supplying of companies with equipment loans.

Financially, the loans are to be analogous to those that bankers make to railways for the purchase of equipment. Loans will be made only to existing companies, and must be used in the purchase of multi-motored aeroplanes so constructed that they can fly with one of the motors cut out. Aeroplanes must be able to take off after a run of less than 300 ft., and a climb of 35 ft. within 500 ft. of the start. The route over which the aeroplanes fly must be approved by the Department of Commerce.

In 1927 the Mississippi, one of the mightiest rivers in the world, broke its banks and flooded great tracts of country. We are told that, thanks to telephones and aircraft, meteorological stations and medical science, it had been possible to warn the inhabitants of the threatened areas in time, to remove them from danger, and to preserve them from famine and pestilence.

The Paris edition of the *New York Herald*, in their issue of the 13th May, 1927, informed us that a Red Cross nurse had just made a night flight of 300 miles to Natchez, Louisiana, to fetch smallpox lymph for a flood refugees' camp, where 10,000 men, women and children were concentrated and where smallpox had broken out.

Immediately on her return, says the *New York Herald*, she began to assist in vaccinating the refugees. Twenty cases of smallpox were reported in the camp.

In "Neon's" view there is little use in air development. But I should imagine that some of these unfortunate people who benefited by the smallpox lymph being procured so quickly would hold a somewhat different opinion.

For some considerable time Vickers-Napier ambulance machines have been used with much success. Recently one of these machines was used in Iraq to take a Chief from his out-of-the-way desert home to Basra, to be operated upon for appendicitis. The case was an urgent one, and the Chief who had his life saved is now devoted to air travel. Some of these machines have two 450 h.p. Napier engines and are designed to carry two stretcher cases, with attendants and the necessary medical equipment. It is easy to imagine how valuable these machines will be in India for frontier services, not only in war time, but to take any person quartered at a distant station who may be suffering or have met with an accident to the nearest centre for hospital treatment. I feel confident that if ambulance aeroplanes are properly developed, thousands and thousands of lives in the Empire and throughout the whole world could be saved and much suffering spared humanity by prompt medical attention. Some of these ambulance machines would, I feel sure, have been of great value in the Mississippi flooded area.

In the use of aircraft as a possible means of saving life, the attention of the naval Noahs throughout the world should be drawn to some really important experiments that have been carried out recently in the United States in connection with the use of aeroplanes in saving ships 'in distress, which will be of interest to all serving in warships or merchant ships. The trials¹ appear to have been very satisfactory, and to have demonstrated the practicability of life-saving by this means. According to *The Army and Navy Register*, an Army aeroplane, taking off from a field, carried the free end of 4,000 ft. of line to a coastguard cutter, and, flying low, the pilot dropped the line accurately across the cutter.

The present method of shooting life-lines is very unsatisfactory, and, although the test was made with the view of saving ships in distress at sea, there is no question that the employment of aircraft in making life-line contacts will be used

¹ Reported in the *Naval and Military Record*.

in preference to the old method of shooting life-lines. The unsatisfactoriness of the last-named method was vividly brought out recently, when 27 life-lines were lost in attempts to establish contact between a life-saving cutter and the United States destroyers that went on the rocks near Point Conception on the Pacific coast.

The opinion has been expressed by the U.S. Air Corps and coastguard personnel in charge of the recent tests that it is practicable that an aeroplane could carry the end of a light steel cable, sent out from shore, to a ship a mile or two at sea. It is predicted that if future tests of this new method of establishing contact between vessels in distress at sea prove as successful, the first aircraft units stationed near the sea or other large bodies of water will be furnished with this contact equipment.

Whether aircraft have been used in connection with ships in distress off our coasts is not within my knowledge. But the subject would seem to warrant study in this country, although the Noahs may be against such a course.

Crossing the border from the United States, it is noticeable that the farmers of Canada seem to value the air more than "Neon" does, for we learn that the Canadian Air Force, with a view to preventing the spread of rust among the wheatfields of the Red River Valley, in Manitoba, sprayed the growing grain with sulphur, which was dropped from aeroplanes as they flew low over the waving wheat.

Rust costs the farmers of Western Canada £5,200,000 every year, and it is in an attempt to reduce this loss that the aviators undertook the task.

I have alluded in other pages to the survey, connecting up of distant mining camps, work with the seal schools, locating water power, etc., now being done by the airmen of Canada, and it is hoped Mr. Baldwin's recent visit to this Dominion will give an impetus to further development in their great country, and in this I feel certain the Canadian airmen will play a not unimportant part.

Looking at other parts of our Empire, we are informed that an air survey expedition is being sent to Northern Rhodesia by a company¹ interested in minerals. The concessions consist of about 52,000 square miles of highly-mineralized bush country.

This air survey is being placed in the hands of a very skilled surveyor, Major R. A. Logan, who has had great experience of air surveying in Canada, and has made valuable reports on flying conditions in the Far North.

Two D.H. 9 machines, fitted with Nimbus engines, specially adapted for survey work, will be utilized, and they will be equipped with the latest survey cameras.

This should be interesting work, and most valuable in opening up Northern and other parts of Rhodesia.

The air routes² that have been and are being developed in Australia are of great interest. The first section was from *Geraldton to Carnarvon* (340 miles), the second was from *Carnarvon to Port Hedland* (500 miles), and the third from *Port Hedland to Derby* (420 miles). The northward service was started every Friday and the mails reached Derby on the Sunday.

The service opened on 5th December, 1921. They had a mishap in the first flight, but after that the Bristols flew north and south each week like clockwork. The squatters must have been indeed surprised at this invasion of their time-honoured isolation by the most modern of all contrivances. But its regularity impressed them, and they soon began to write letters and send them by air mail. Doubtless they were at first very surprised to find that the letters were invariably delivered at the scheduled time, and that answers came back with equal speed. By May, 1922, the airway was carrying 5,000 letters a month, at a surcharge of 3d. a letter. In July of that year, the number jumped up to 10,570 letters. The airway was beginning to create its own traffic. The increase

¹ Minerals Separation, Ltd.

² From the *Air League Bulletin*.

was steadily maintained, and June, 1925, saw the figure of 20,000 letters reached and surpassed. Progress has gone on steadily ever since, and now about 24,000 letters are carried every month.

Passengers came in more slowly, as was to be expected. It was some time before an average of 30 a month was reached, and August, 1925, was the first month which achieved three figures. Flying over thinly-populated country and with small machines, large numbers of passengers could not reasonably be hoped for. But none the less the monthly figures rose steadily and are still rising. Freight, however, shows the most remarkable rate of advance. In 1922 and 1923 the average was about 400 lb. per mensem ; it now stands at about 5,000 lb. per mensem.

In January, 1924, the route was extended southwards from Geraldton to Perth. It had been found that the railway did not really help the air line. People in the capital who wanted to travel or to send letters quickly preferred to use the air service the whole way. The total route from Perth to Derby is 1,442 miles, and, with the exception of the U.S.A. air mail from New York to San Francisco, is the longest in the world.

Throughout its five years in operation, West Australian Airways has maintained an efficiency of practically 100 per cent, although it uses only single-engined aeroplanes ; and on its regular mail services it has since the opening flight been free from serious accidents. Moreover, the company not long ago declared a dividend of 10 per cent on its shares. Mr. E. R. Peacock, a veteran journalist, who recently flew from Perth to Derby and back, wrote in the Melbourne paper, *Aircraft*, that this airway is " the greatest thing in Australia." This air route is 1,442 miles, and is now flown regularly in 2½ days, whereas the coastal steamers have an irregular service and take about 13 days.

In 1922 the Commonwealth Government, much pleased with the success of the West Australian air line, decided to subsidize an air mail service between Charleville and Cloncurry,

a distance of 577 miles, offering the same terms as before, namely, 4s. a mile for one flight each way weekly, or £12,000 per annum in all. This subsidy, likewise, has recently been reduced to 3s. 3d. per mile. There were several tenders, but it is not surprising that the contract was granted to the experienced and enterprising firm of Qantas. [Qantas]

The route should be carefully studied on the map, because it is one of the most cleverly thought out air routes in the world. From Brisbane, the capital, a railway runs northward along the coast, linking up the ports of Rockhampton and Townsville. From these three ports, feeder lines run inland to serve the grazing districts. The rail from Brisbane runs west as far as Charleville; that from Rockhampton has two branches, one of which passes through Blackall and the other terminates at Longreach, while the rail from Townsville also forks and runs to Winton and Cloncurry. Now, Charleville and Longreach are only 267 miles apart, but consider the undertaking which lies before (say) a wool-buyer, who wants to travel from one to the other by train—not a good train either—in tropical heat. Or, again, consider on the map the train journey from Longreach to Winton. Never was there another such chance for the aeroplane to serve mankind. It links up five railway lines at their hinterland ends.

On 2nd November, 1922, the opening flight was made with an Armstrong-Whitworth machine from Charleville as far as Longreach, where the headquarters of the company are situated. Next day the trip was continued to Cloncurry, carrying as passenger a Mr. Alexander Kennedy, who was then over 86 years of age. He recalled that he had first journeyed up from Rockhampton to Cloncurry in 1870 by pack-horse, and that trip took him eight months. This time he travelled from Longreach to Cloncurry in four hours. He added, "I will never again travel to Cloncurry except by aeroplane. I shall return to Charleville by air in about a fortnight, if I can get a seat." And he did.

Our Australian cousins, according to "Neon's" delusion

that air development is of no value, must be becoming unbalanced, as on 22nd August of last year,¹ Reuter informs us that, in confirming the report that the Federal Government had decided to allocate an additional £200,000 to the development of civil aviation, thus bringing the total sum devoted to this purpose up to £315,000, Mr. Bruce, the Commonwealth Prime Minister, stated to-day that he proposed immediately to inaugurate considerable additional services, one of the first of which would be between Adelaide and Perth. Other lines would be from Camooweal to Darwin Railhead, from Brisbane to Sydney, and possibly from Melbourne to Tasmania.

The report referred to added that a scheme was being worked out to bring the most distant parts of the Commonwealth within four days' journey of the capitals of the Eastern States, and to encircle the whole Continent with a series of airways.

"Neon" thinks the aeroplane is useless except as a weapon of frightfulness, whereas I think they will be of great benefit to humanity. In support of this view, I would quote an announcement by the United Press,² which states—

A flying squad of six doctors to attend patients in the remote regions of the Australian bush will be organized and formally inaugurated on 1st April, according to an official announcement to-day.

Each of the doctors will be equipped with an airplane and will cover an area of approximately 400 miles, so that the stockmen in the isolated areas will not have to suffer for lack of early medical aid in case of sickness or injury, even if they happen to live hundreds of miles from the nearest settlement.

Hospitals will be equipped with wireless receiving sets, and the telegraphic service will co-operate in the plan. The planes will be built so that patients in a critical condition can be carried by air to the hospital. Supplies of gasoline will be distributed in the various areas to be covered by the flying doctors.

The plan was worked out by the combined efforts of the Australian branch of the British Medical Association, known as the Australian Inland Mission, and the Federal and State Governments.

This high-speed medical service will be a boon and a blessing

¹ 1927. ² Sydney, Friday, 23rd September, 1927.

to all up-country settlers. Many men and women suffer much anxiety when far from medical aid. I think I am correct in saying that many would-be settlers are deterred from opening up remote districts because they fear the risks their wives and families would have to run when so far from medical attendance. They do not mind the distances so much, but it is the tremendous time it takes to travel them that is the chief objection to those who have families.

Captain Hughes, the President of the Aero Club, at a recent luncheon in Sydney, said—

That primarily the medical service had been organized by two members of the Australian Board of Inland Missions, the Rev. J. Flynn and Rev. J. A. Barber. The organization was now being controlled by a committee having its headquarters in Melbourne. The £7,000 necessary to start the scheme had been obtained.

The establishment of these medical services will help colonization enormously, and it is hoped that this scheme will be extended to cover the whole interior of Australia. The reverend gentlemen are to be most warmly congratulated on their fine pioneer work in this direction, and they will have the thanks of all progressive people.

I should like to call the reader's attention to the *Evening Standard* of the 19th December, 1927, which informs us that there is a new and swift way of avoiding the old travel difficulties and privations. The article states that—

There is more than £12,000,000 worth of gold in one reef of the Edie Creek and Bulolo gold-fields in the mandated territory of New Guinea, according to a report forwarded by Mr. James D. McLean, the Mining Warden, to the Australian Minister for Home and Territories, Mr. C. W. C. Marr (says a British United Press Sydney telegram).

This reef extends for a distance of five miles and it is estimated that it will produce 20 oz. to the ton. The gold, the report declares, is worth £2 4s. an ounce, and is in stone that can be easily worked.

Mr. McLean deals at length with the enormous mining wealth of New Guinea. Almost every known mineral, he declares, has been discovered, in addition to gold. There are indications, too, he states, that the country contains oil.

The early miners in the Edie Creek field had to endure many privations. The mountainous character of the country necessitated a journey of three weeks to reach the field. Aeroplanes have lessened the perils of travel, and the companies operating the air service have ordered larger machines from Great Britain and Australia in order that they may carry heavier loads of provisions, as well as parts of stamping batteries for the gold quartz.

Every ship arriving at Sydney from New Guinea ports brings large consignments of gold. One ship recently carried 17,000 oz., valued at nearly £40,000. Altogether more than £300,000 worth of gold has been shipped to Sydney since the field was opened up a little more than twelve months ago.

Thousands of ounces of gold are in strong-rooms of banks in New Guinea awaiting shipment.

In September, 1927, news came from Winnipeg that—

Nineteen children have been burned to death in a fire which destroyed a Catholic boarding school at Isle La Blonde, 300 miles north-west of Prince Albert, Saskatchewan.

Many children at the school were injured.

Seaplanes are taking medical supplies, doctors, and nurses to the sufferers.

These sufferers, even to please "Neon," would scarcely say seaplanes are quite useless.

Again, on 8th April, 1928, *The Observer* informs us—

Seventeen Norwegian whaling ships, wedged in the ice of the White Sea off the Kanin Peninsula, were rescued through the aid of radio and aeroplane.

Learning the plight of the ships through a radio message, a Soviet airman travelled over 300 miles in four hours, located the ships, then guided an ice-breaker, which extricated the ships from their dangerous position and brought them to the open sea.

A good example of the necessity for being first in the field in establishing air routes is given by the refusal of the Persian Government to allow our machines to fly along the Persian coast. That means that the air route to India by way of Basra, Bushire, Bandar Abbas and Chahbar cannot now function, and some alternative route will have to be surveyed on the Arabian side of the Persian Gulf for our air route. Some people say that Bolshevik influence is behind this refusal on the part

of the Persian Government. But I doubt it. This is an unfortunate setback, particularly when we learn that the Middle-East air service of Imperial Airways continued to run with complete regularity during July. The total mileage covered in that month was 10,183, occupying 114.19 hours.

The imposition of five days' quarantine on all travellers passing through Basra as the result of an outbreak of plague has quite unexpectedly shown a new advantage to the credit of air transport. A certain Arab dignitary, returning from a pilgrimage, found that travelling by the normal methods would let him in for the said five days of quarantine at Basra. He accordingly hired an Imperial Airways special, which circum-navigated Basra and landed him on a convenient islet in the Persian Gulf, from which he was picked up by a passing boat and was able to continue his journey.

High winds and sandstorms occur with great frequency and regularity on the route between Bagdad and Basra at this season. Imperial Airways pilots have found that in this particular type of weather the strength of the wind often decreases very markedly at high altitude—in direct contrast to our habit here, where we fly low to get out of the wind. When there is a strong head-wind at the ground, it often pays, along the river route, to go up to as high as 10,000 ft. to get out of it.

All naval men know that there are few more important places in the world than Singapore. It is a sort of "Charing Cross" of the commerce of the East. In normal times more ships pass through Singapore in a day than arrive at Hull, Bristol, Southampton and Glasgow all added together. It is an ideal place for air development, and I learn a new company, to be called Eastern Airways, Ltd., is going to explore what can be done to speed up communication and travel between Singapore, Penang, and Port Swettenham.

As my father-in-law, the late Lieutenant-General Sir Andrew Clarke, R.E., was so successful in his administration as Governor of Singapore, I am most interested in this movement, and I hope, whoever the directors may be, that they will study the

boat type of seaplane that we did so much to develop at Felixstowe. The distances are not great, Singapore to Batavia only taking a few hours. In the near future, I hope to see the residents of Singapore owning their own, or clubbing together to own, their private boat-type seaplane for week-end parties to cooler places.

There is a tremendous opening in the East for seaplane development.

Now a word about the British Air Industry. At one time I was able to render a service to the pioneers of the Aircraft Industry by preventing them being swallowed up in a State factory at Farnborough. The stand I took at that time I have never had any reason to regret. Before the war I managed to keep a few firms just going by distributing the orders for the Naval Air Service as evenly as I possibly could. The Director of Contracts and his very able staff at the Admiralty helped in every possible way. The money available was small, but I do think, when considering the whole matter many years after, that our firms gave us really wonderful machines for the very little financial encouragement we were able to give them.

When war unfortunately broke out, General Henderson discussed the whole matter of placing orders with me, and, with General Brancker's good and always welcome assistance, we divided the firms between the Royal Flying Corps and Royal Naval Air Service. Of those allotted to the Navy, I cannot express in words the way Thomas Sopwith, A. V. Roe and his brother, Horace Short and his two brothers, Holt Thomas, Handley-Page, Blackburn, Fairey, Saunders, the Sunbeam Co., Rolls-Royce, and others worked. Between us we broke much new ground. Every call I made upon them was always responded to with great willingness, and although we were experiencing the stress of war, we never had the slightest friction, and I think few will disagree with me when I say our constructors turned out for General Henderson and myself some of the finest machines in the world.

When the Royal Air Force was formed, they naturally had

not had time to develop many new designs before war ceased, but they benefited largely by the policy General Henderson and I had pursued from 1912 onwards, and when I asked Lord Weir if he was satisfied with the material turned over to him, he told me it was first class.

Many new firms were called upon to come into the industry as the air demands in the war increased, and the pioneer air firms, to their great credit, working hard for the State, willingly turned over to the new firms the fruits of their many years of hard toil, and gave them every possible assistance to get going in aircraft production.

Our machines were excellent in construction, and when war ceased we led the world.

During the War we passed to the Curtis Co. and other firms in America valuable aeronautical data that we had built up. This enabled America, when she came into the war, to have the advantage of our air experience, gained under unusually hard conditions. Being able to acquire readily all this information has enabled America to develop her air industry into a very advantageous position, as can be seen by the series of transatlantic successes that have been added to that country's aeronautical achievements during the past year (1927).

Now that our international trade in warships is likely to fall off, there is no reason why our skilled aeronautical constructors, designers and engineers should not lead the way in aircraft manufacture. We have the ability, the men, the factories. All they need is more encouragement, with plenty of research work to investigate the possibility of obtaining more silent machines. There is, I believe, abundance of evidence to show that pusher propellers and geared propellers are more silent than tractor propellers and direct driven propellers, but this whole question of producing more silent machines requires searching investigation.

Gyroscope control for flying through clouds is now so efficient that I have little doubt it will be adopted for machines making long cruises, and the weight of this apparatus is not excessive.

The attention of constructors is drawn to the necessity of providing good brakes to prevent the aerodromes from being ploughed up.

We should aim at an aircraft industry to rank with the great industry of shipping, and I see no reason why the aeronautical branch of engineering should not now receive all the recognition that the other branches of engineering science do. I think the Fellows of the Royal Society should give more encouragement to the science of aeronautics. The air press can help in demanding for those engaged in building up the aeronautical industry full recognition by the country for their work. The air press can play a greater part than it has previously done by urging a great Empire air policy and pressing the Government and Air Ministry to continue to blaze new air trails wherever possible. The airmen throughout the Empire have the spirit of adventure. The pioneering force is in their veins, they want encouragement in helping to open up new lands in our great Empire and forge commercial air links.

I see no reason why our air press, which has helped so much to stimulate interest in air matters, should not receive full recognition for their work. It is no easy task to work year in and year out at air propaganda with bricks as the chief reward. Those of us who have worked at the air movement have received great fairness and much encouragement from the air press. It seems to me that the members of the Air press are just as worthy of reward as other distinguished members of the profession who have achieved much well-deserved honour.

Another class it seems to me is always neglected, and that is the maintenance staffs. They work very hard to keep the machines efficient. Surely some of their work should be occasionally recognized, and we must not forget the pilots, who fly day in and day out, year by year. These steady men do much for air development, and in the hands of these gallant airmen the future of the air largely lies.

If we take the right course, there is no reason why we should not develop in this country the same aptitude for the air as

we have achieved as regards the sea. Recent air development owes much to the wise guidance of Mr. Thomas Sopwith, who for three years in succession has been Chairman of the Society of Aircraft Constructors. I can say to him what I would hesitate to say to anybody else. The aircraft constructors lean rather towards the little view. There is much overseas development to be done. I have heard Mr. Robert Blackburn's name associated with the Khartoum-Kisumu air route, but I haven't yet heard of other firms taking on pioneer work. Great industries are not built up by living on the past, however meritorious that may be. Again, our aircraft constructors should look into the possibilities of seaplane development a little more.

Sir Samuel Hoare's recent trip in the Baltic opens up visions of real pleasure cruises in this type of aircraft. All that is necessary is to develop these machines on much larger lines, so that they can give their passengers the maximum amount of room for free movement.

In one of the boat-type seaplanes Commander Porte developed at Felixstowe we could never tell when we left the water and she came down in the sea with great ease. The only drawback was the restricted movement of a passenger. I felt much too cramped.

In the early Holland submarine boats it was two steps and overboard. Now look at our modern submarines, what commodious craft they are. Splendid accommodation, with every convenience, all developed from No. 1 Holland. The submerged displacement of No. 1 Holland was 120 tons, and that of the *Oberon*, one of our latest submarines, is 1,805 tons. That is the growth our seaplane designers should seek to imitate for seaplane passengers and transport service.

There is no reason why we should not develop all-metal flying ships. At Felixstowe we showed what could be done from the Donnet L'Eveque and Sopwith Bat Boat days in producing large boat-type seaplanes that were of great use in the War. It is up to the seaplane constructors to progress still further. Messrs. Shorts, the Supermarine Co., Avro and

Blackburn are making a good start, but they must take the big view and go full out for building flying ships, not boats.

Seaplanes can be used with considerable advantage round our coasts in spotting shoals of fish and also in protection of the fishing industry. Recently a seaplane from the cruiser *Vigilant* caught the Fleetwood steam trawler *Alida* using the illegal method of otter trawling, which is a tackle consisting of a float with a line and a number of hooks. The master was fined £120 at Campbeltown Sheriff-Court, Argyllshire. This seems to me to be useful work.

Every harbour and inland water round our coasts is a possible aerodrome. Then there are the lakes all waiting to be developed. When at the Admiralty, the late Commander Truscott, R.N., a skilful navigator, tabulated for me all the waters in these islands where our first naval rigid airship could land on the water. That valuable book would make an excellent beginning for flying-ship sailing directions. There are vast possibilities in the flying ship, and I do think our constructors would be wise to give this side of aeronautics more attention. We could, with little trouble, lead the world in flying-ship construction.

What could be more delightful than cruising in the Mediterranean in a flying ship? Where are our millionaires? Will not some of them encourage the building of these flying vessels in the same way as the millionaires in the United States are tumbling over each other to advance air development in their country?

Quite good sleeping accommodation can be provided in these flying ships and they can be self-contained.

I have no connection, directly or indirectly, with any air enterprise, but I do think some of the rich men of this country might also use their surplus wealth in founding air routes. The Air Ministry could point out the routes that need development, and to have an air route named after one to hand down to posterity is not lightly to be thrown on one side by any millionaire.

One of the most curious phenomena in the science of aeronautics is the return to favour of the monoplane. In the early days of flying monoplanes were chiefly popular with pilots, as a greater speed could be obtained by them than with the biplane. Then we had in the Royal Flying Corps a series of bad accidents, and a Monoplane Accident Committee was appointed to go into the whole question of using these machines. The Royal Naval Air Service and Royal Flying Corps ceased to use monoplanes, not entirely on account of these accidents, but because our skilled aeroplane constructor, Thomas Sopwith, produced his high-performance machine, the "1½ Strutter," and showed a biplane could almost reach the top speed of a monoplane.

There is no doubt, from a designer's point of view, you get a much cleaner approach with less resistance with a monoplane than a biplane, also greater simplicity and ease of construction. In 1912 I was much taken with the Ettrick monoplane that Colonel O'Gorman and myself saw the Austrian military officers fly with such skill at their military aerodrome, Wiener Neustadt, just outside Vienna. Major Von Petroczy showed us every courtesy and the two latest monoplanes of this type during our visit to the military aerodrome, one of the finest I have ever seen. But since that time little air development has taken place. This is unfortunate, as Austria used to have fine pilots. Her position is central, she has good workshops, experienced mechanics, and could soon make civil aviation a success.

I have often wondered why our constructors have not studied the monoplane a little more. With present-day aeronautical knowledge there can be no difference in safety between the monoplane or the biplane, and aerodynamically the monoplane has the advantage.

Captain Broad's recent world's record with the Tiger Moth and the great transatlantic flights will popularize the monoplane, and it will, no doubt, regain its former premier place for high-speed air travel.

For the Government to say they would only help Imperial

communication in the grand way of subsidizing a few Imperial air routes is, to my way of thinking, the little view. The Government should blaze the trail everywhere. They should always be exploring new air routes within the Empire. The Navy League slogan of "Trade follows the Flag" was good, and we should develop a few slogans such as "Air Travel and Air Transport follows the Air Flag."

In dealing with Empire policy, I have shown how the air can help the settler.

Mr. Baldwin, on his return from Canada, said¹—

You may learn that in spite of some thickly-populated areas and great manufacturing cities, such as Montreal and Toronto, there are over the whole dominion only three persons to the square mile. Then you will begin to see why Canada's problems are so different from our own.

These places are thinly populated, largely because people do not like to be cut off too much from their fellow men.

Develop air routes to all the principal towns not connected by fast railways and we would soon have the vacant places within our Empire well populated and quickly developed.

Either the aeroplane, seaplane, or airship can go to almost every spot within the Empire. In one place a land aerodrome may be more easy to develop; in another, a seaplane station may be found more suitable.

The more we develop civil aviation, the better able we are to concentrate an effective Air Force on any threatened point within the Empire, and I do think, as far as civil aviation is concerned, we should take a lesson from Germany. In that country money has always been forthcoming to develop aeronautics, and now they are reaping the benefit of their enterprise with practically a solid population taking an interest and using air travel as we do taxicabs.

It is quite unthinkable that we should cry a halt or mark time in the development of civil aviation, as "Neon" would desire.

¹ 24th August, 1927.

Pulford made a good point in his lecture at the Royal United Service Institute, when he informed us that—

On the homeward flight a wire was sent to Abercorn from Pretoria fourteen days before we were due to land there, but we found on arrival that the message had arrived only just before we did. The wires were down and the message had had to be brought over a hundred miles by runners.

This incident draws attention to the new order of things against the old. When the wires are down, runners must be placed by airmen, and the sooner the better.

Fortunately, in most of our Empire there are no international complications. The question of permission to fly over European nations' territory is one of some difficulty. In this country we cannot send our machines to Northern or Eastern Europe without permission.

We have lately signed a general agreement relating to air navigation between Great Britain and Germany. This agreement was finally ratified on December 1st, 1927.

The agreement permits the flight of individual civil machines over Germany without previous notice, but where regular air routes operated by an air transport company are concerned each service shall be the subject of the special permission of the competent aviation authorities of both countries. At present the Germans have agreed to our daily service to Cologne, and we have agreed to a daily service by Luft Hansa to London. The Germans have lately applied for permission to operate a daily freight service to London from Essen, and to this we are in process of agreeing, indicating that we expect similar concessions from Germany when we may require them in the future.

Once outside Europe, the British Empire is in a good position for developing air transport and air travel.

We can develop Malta and Cyprus, but Egypt will be the air hub, as great distances can be flown from Egypt without international questions arising. To the south there is the whole stretch of Africa to the Cape. India is to the East—Singapore

should develop into a most important air centre and feed a large area in the Straits Settlements. Then there is Australia to the south-east.

When we have our Eastern air routes well established, we have an important air route to develop, England-Azores-West Indies, or England-Azores-British Guiana. The traffic service in the West Indies is well worth developing. I recollect, when serving in H.M.S. *Active* as a midshipman, we had a delightful cruise in the West Indies, visiting Barbados, St. Kitts, St. Lucia, Antigua, and many other ports.

I can imagine no finer field for seaplane work than to connect up the islands of the West Indies. Except during the hurricane season the weather conditions are almost perfect for flying. The distances between the islands are not great ; many of the harbours are good and quite land-locked.

The civil side within all countries of the Empire is just as important as the Imperial communication side. High-speed air travel and air transport throughout the Empire should be our great aim.

Our air policy should include every phase of civil flying by airships, aeroplanes, or seaplanes, and where the Colony or Dependency cannot carry out the work, then the Imperial Government should step in and detail the Air Ministry to blaze the trail and give their advice to these administrations on the wisest course to take to develop commercial air routes and meteorological stations to assist in opening-up their country.

The new generation of airmen are unconquerable ; there is no such word as " fail " in their dictionary. They know that air transport is the most rapid form of travel available. With a little encouragement, they are prepared to play their full part in creating a network of commercial air routes throughout the Empire and so link up all the distant places that are now so badly cut off from the nearest towns. In so doing they will add to the prosperity, happiness, and general well-being of thousands and thousands of our kinsmen throughout the whole Empire, and earn the gratitude of future generations.

Beware of soft jobs. Don't listen to people who tell you man was made for happiness. He was not; he was made for something infinitely bigger than happiness. He was made for doing physical, beautiful, heroic work, and the only happiness he is entitled to as a right is the happiness that comes from doing his work with all the excellence that it demands of him.¹

¹ Extract from an address delivered on "The Right to be Happy" at Leighton Park School, Reading, by Dr. Jacks, Principal of Manchester College, Oxford, on 1st July, 1927.

CHAPTER XIII

THE VALUE OF LONG-DISTANCE FLIGHTS

Safe may'st thou wander, safe return again.

SHAKESPEARE—*Cymbeline*.

THE historic flight of M. Blériot across the Channel was made in 1909, and it was not until May, 1919, that the first transatlantic flight was attempted by that intrepid airman, the late Harry Hawker, who was the highly-skilled pilot associated with Mr. Tom Sopwith in testing many of his experimental machines. Hawker carried out this special duty with much skill, and we were all indebted to him for the care and trouble he took in testing machines for the Air Service.

In his transatlantic flight Hawker was accompanied by Commander Mackenzie Grieve as a navigator, and they attempted to win the *Daily Mail* £10,000 prize for the first direct flight across the Atlantic.

These gallant pioneers of Atlantic flight started on 18th May, 1919, from the Canadian side in a Sopwith machine (*Atlantic*), but were unfortunately obliged to come down in the sea through radiator trouble, in which the water frequently boiled, some 750 miles off the west coast of Ireland, after a non-stop flight of 1,100 miles. They were the first to face the vastness of the great Atlantic with the danger of a forced descent. It was a most gallant attempt, and we were all much relieved, after six days' suspense, to hear that Hawker and Grieve were picked up by the small Danish steamer, *Mary*. The captain had much difficulty in launching his boat. But the gallant Danes are fine seamen and succeeded eventually in rescuing these two airmen when seas were breaking over the machine. Also in May, 1919, Lieutenant-Commander Reed, Lieutenant-Commander Towers and Lieutenant Walter Hinton, officers in the United States Navy, successfully crossed in a flying boat type

of seaplane, N.C. 4, from Newfoundland to the Azores, the Azores to Lisbon, and Lisbon to Plymouth. This type of flying boat was similar to those we developed so successfully at Felixstowe. It may be recalled that the late Commander Porte was assisting at the Curtis Co.'s¹ works in the United States to produce for Mr. Rodman Wanamaker, the great air patron in America, a transatlantic flying boat when war broke out.

On Commander Porte's recommendation, I obtained approval to purchase for the Admiralty Mr. Wanamaker's two flying boats that he kindly placed at our disposal, and subsequently we ordered a large number of flying boats from the Curtis Co. during the early part of the War.

At Messrs. Curtis's works we placed a very able inspector and one of the first to gain his pilot's certificate in this country, Lieutenant-Commander Maurice Egerton.² All the data we gained in actual flying experience in the North Sea we passed through Lieutenant-Commander Egerton to the Curtis Co. Consequently, that firm were well up to date when America came into the War, and they built the N.C. 4 that the gallant American naval pilots flew so successfully across the Atlantic from Newfoundland to Plymouth. Lieutenant-Commander Egerton must have watched this flight with much interest, as it showed what a firm could accomplish from small beginnings.

On 14-15th June, 1919, one of my old comrades in the Royal Naval Air Service, Captain J. Alcock, D.S.C., and Lieutenant Whitten Brown, in a Vickers-Vimy biplane fitted with two Rolls-Royce engines, flew from Newfoundland to Clifden, Ireland, in 15 hours 57 minutes, and covered 1,880 miles, winning the *Daily Mail* prize of £10,000. This fine effort was the first non-stop direct Atlantic flight. Unfortunately, the machine was damaged in landing, and Alcock said: "We scarcely saw the sun or the moon or the stars, the fog was very dense, and at times we had to descend to within 300 ft. of the

¹ Messrs. Glen Curtis Co., Hammondsport, New York.

² Now Lord Egerton of Tatton.

sea. For four hours the machine was covered in a sheet of ice caused by the frozen sleet."

Both of these aviators were knighted by the King for their great feat. Unfortunately, Sir John Alcock was killed in an air crash 30 miles from Rouen during a flight from England to France.

In March-June, 1922, two skilled Portuguese airmen, Commander Cabral and Commander Courtinno, successfully flew from Lisbon to the Canary Islands, the Canary Islands to Cape Verde Islands, Cape Verde Islands to St. Paul's Rock (500 miles off the coast of Brazil), and from St. Paul's Rock to Pernambuco. In January, 1926, a Spanish airman, Commandante Franco, flew from the Canary Islands to the Fernando Noronha Islands, 200 miles from the South American mainland, from Fernando Noronha to Pernambuco. This was a really splendid flight, and the Commandante should receive much credit on being the first man to fly the Southern Atlantic. "Neon" "crabs" this flight, from the point of view that Franco did not fly back. If "Neon" had written to any of the Directors of the Napier Co., as Franco used Napier Lion engines in his machine, the reason for the return flight not being made would have been disclosed. It was for the simple reason that Commandante Franco was ordered by the Spanish Government to present his machine to the Argentine Government and return by passenger steamer.

In February, 1927, the Marchese de Pinedo, one of the most skilled of all Italian airmen, flew, in a Savoia twin-hulled seaplane fitted with two 500 h.p. Isotta Fraschini "Asso" engines, from the Cape Verde Islands to the Fernando Noronha Islands, the Fernando Noronha Islands to Pernambuco, in his great air voyage round the Atlantic. Signor Mussolini sent him an inspiring message when he left on this enterprise.

After de Pinedo had arrived at New Mexico, the carelessness of a bystander with a match or lighted cigarette, caused his machine to catch fire on Lake Roosevelt, and it was severely damaged before the flames could be extinguished. Early in

May¹ a new machine, the Savoia *Santa Maria II*, fitted with two 500 h.p. Isotta Fraschini "Asso" engines, arrived for him, and he then flew to New York, New York to Boston, Boston to Chicago, Montreal and Newfoundland. From Newfoundland he flew to the Azores, then to Madrid. On arrival at Ostia, Rome's seaport, on 16th June, Signor Mussolini and a great crowd gave the Marchese and his two companions, Captain del Prete and Air-Mechanic Zacchetti, a tremendous welcome. This was a fine tribute to the dogged determination in completing this great task of flying 25,000 miles round the Atlantic that the Marchese de Pinedo had undertaken.

In March, 1927, another skilled Portuguese airman, Lieut.-Colonel Sarmento, flew from the Bessagos Islands, lying off Portuguese West Africa, to the Fernando Noronha Islands, a distance of 1,450 miles, and then on to Brazil.

On Saturday, 21st May, 1927, great excitement prevailed in Paris, for had not a lone airman, Captain Lindbergh, left Long Island, New York, at 12.51 p.m. (British time) the day before and passed over St. John's, Newfoundland, about midnight on his flight across the Atlantic? On 21st May he was sighted by an Atlantic liner about 500 miles east of Newfoundland; at 13.00 hours he was sighted by the S.S. *Hilversum*, when 500 miles from the Irish coast. At 17.20 hours he passed over the coast of County Kerry, Irish Free State, at 19.40 he passed over St. Germans, Cornwall, at 20.30 he was over Cherbourg, and at 22.22 hours he arrived at Le Bourget, the air port of Paris, having covered a distance of 3,700 miles in 33 hours 50 minutes. This was indeed a great lone flight, and Captain Lindbergh must have been pleased to receive the following cablegram from President Coolidge, which read—

The American people rejoice with me at the brilliant termination of your heroic flight.

I feel confident that all airmen of all nationalities were delighted to hear of Lindbergh's remarkable achievement in flying from New York to Paris.

¹ 1927.

To be able to fly the Atlantic alone and make a perfect landing at night at Le Bourget Aerodrome was a feat to be remembered, and almost too much for the enthusiastic French people. The 34th Regiment of Aviation had their work cut out to keep the gallant American pilot from the kind attention of the enormous crowd that assembled on the aerodrome to give this intrepid man a right good warm Paris welcome. Before achieving this historic flight, Captain Lindbergh had proved himself to be a good pilot on the St. Louis-Chicago Air Line, and he named his machine *The Spirit of St. Louis*.

The Ryan Air Line of San Diego, a comparatively new company, built Lindbergh's machine to the order of a group of business men in St. Louis.

She was designed by a skilled Italian engineer, Signor Bellanca, for the single purpose of flying the Atlantic, and is of the monoplane type, having the following particulars—

Span	46 ft.
Chord	7 ft.
Gross weight	4,750 lb.
Power plant	200 h.p. Wright Whirlwind
Gasoline—425 gal.	2,550 lb.
Oil—28 gal.	195 lb.
Wind loading	14.9 lb. to sq. ft.
Power loading	21.6 lb. to b.h.p.
Max. speed with full load	123 m.p.h.
Cruising speed ($\frac{3}{4}$ throttle) approx.	105 m.p.h.
Minimum speed with full load	69 m.p.h.
Cruising speed with fuel and oil used	95 m.p.h.
Maximum propeller efficiency	74 per cent approx.

A remarkable feature about this machine's production is that it was actually taken up on its first test flight on the sixtieth day from the time when its design was started.¹

The monoplane is neatly designed, and most skilfully constructed. The fabric facing of her wing struts is as taut as parchment.

The view from the cabin is very restricted, a small window

¹ This specification was given in *Aeroplans* of 25th May, 1927.

on the port and starboard side, an overhead skylight, and a 2½ in. periscope is all that is provided with the usual array of instruments on the dash board.

Two compasses complete the outfit ; one is the usual magnetic type and the other is a Pioneer Earth Inductor compass, which I hear is a most successful and reliable instrument.

The designers reduced the head resistance to a minimum, and the propeller was all-metal. In looking at Lindbergh's closed-in machine one could not help being struck with the resemblance to a machine that the brothers A. V. Roe and H. V. Roe built in this country before the War. Many people may remember Lieutenant Park, Royal Navy, flying this monoplane at Brooklands in 1912. The candid friend of all airmen, airshipmen included, Mr. C. G. Grey, the able editor of *The Aeroplane*, draws attention to this resemblance, which I have verified by a photograph in my possession, and rightly says the Roe brothers should receive some measure of credit for their foresight in building a machine so much like *The Spirit of St. Louis* monoplane over 15 years ago.

When Lindbergh arrived at Washington on 11th June, he received a tremendous welcome from his countrymen, and right-well he deserved every atom of it.

He travelled from Europe to the United States in the cruiser *Memphis*. When the ship was being berthed, a multitude gathered in the grounds of the Washington Monument to welcome their daring pilot, and witness the President of the Republic present him with the first American Distinguished Flying Cross ever struck. Mrs. Lindbergh must have been proud to see her son receive such a high distinction. Captain Lindbergh, in a brief speech, gave this message from Europe—

On the evening of 24th May I arrived at Le Bourget. During the week I spent in France, the day in Belgium and the short period in London and England the people of France and the people of Europe requested that I should bring back to the people of America one message.

At every gathering, at every meeting I attended were the same words : " You have seen the affection of the people of France and

the people of Europe for the people of America demonstrated to you."

In reading this message Lindbergh gave to his fellow countrymen and women from Europe, it is pertinent to ask : What *do* we think of Lindbergh on this side of the Atlantic ?

Sir Samuel Hoare introduced Lindbergh to me at the luncheon the Air Ministry gave in his honour at Claridge's Hotel, kindly saying I was one of the old air pioneers in this country. Then I listened to Lindbergh's speech at the air banquet, and saw him accompanying Lady Astor, his celebrated countrywoman and first woman Member to take her seat in the British Parliament, on the Terrace of the House of Commons. There many members had assembled to give him good greeting like we had done to Cobham a short time previously.

Lindbergh's smile was delightful. It was the smile of an intrepid man who had accomplished much, and, as one who with my former able secretary, Flight-Commander Michell, R.N., has selected a good many men for training as pilots, I think we would have selected Lindbergh on sight for training as a flying man. All of us greatly admired the modesty with which he took the laurels literally showered upon him. Lindbergh simply declined to be swept off his feet by his success. I am informed that he refused the fabulous sums offered to him to appear at music halls, as a "movie star turn," as a Director of aviation companies, and the very many offers of huge sums that America alone can offer for publicity purposes to those who achieve celebrity. He refused to lend his name to be advertised on brands of goods.

Lindbergh was given the finest reception ever given to any man in the United States. Even Admiral Dewey, after Manila, Spanish-American War, 1898, did not receive a better welcome. An eye-witness informed me that 1,800 tons of paper were torn up and showered from the sky-scrapers of New York on the procession of welcome, and in one place so keen were the people to give him good vocal greetings that they quite forgot

to give him any luncheon. Most people will admire Lindbergh's attitude. He somehow appeals to the better nature that does exist in mankind, and in my opinion he represents the very best, finest, and truest type of young American manhood.

At the banquet given by the Royal Aero Club, Aeronautical Society, Air League, and Society of British Aircraft Constructors, Lord Thomson and Sir Philip Sassoon, the Under-Secretary of State for Air, gave him a most appreciative welcome from all airmen in this country, but Sir Hugh Trenchard topped all compliments by simply saying: "The Royal Air Force took off their hats to him."

The mere crossing of the Atlantic was not what the mass of the people in this country, France, and Belgium most admired. It was that Lindbergh, with no flourish of trumpets, flew, not from New York to anywhere in Ireland, Scotland, England, or Europe, but that he flew from New York to Paris according to plan, without any fuss or advertising of any kind beforehand. Few people knew on this side of the Atlantic that this flight was contemplated.

The loneliness of Lindbergh's flight fires the imagination; it was a daring feat, and he was about twice the time in the air than was Alcock in making the first transatlantic flight.

This was a deed that had never been done before. It was like young Warneford engaging for the first time in history a large German Zeppelin airship, single-handed, in the Great War, and bringing it down in Belgium in flames.

I have searched my brains, and have asked many people what they think of Lindbergh's feat. He had nobody to relieve him or help in any way. He had to do the piloting and navigating himself. It was a wonderful test of endurance. For "four o'clock in the morning" courage, I believe Lindbergh's flight is the best effort a human has ever made.

The way he managed to remain awake and to keep the machine on her course for all those hours with no encouragement from a second person, shows he was in the pink of condition, with nerves of steel.

During February, 1928, Lindbergh has rendered most valuable services to his country in his "good will" flight round Latin-America.

News¹ comes from Paris that the Committee of the International League of Aviators have decided to award the 1927 International Trophy for Men to Colonel Lindbergh. The trophy carries with it the title of Champion Aviator of the World.

Scarcely had we replaced our hats after saluting Lindbergh for making his lone flight across the Atlantic than we hear for the first time in history that another American aviator, Mr. Clarence Chamberlin, has carried Mr. Levine as a passenger from America to Germany.

They left New York soon after noon, Saturday, British summer time, and came down through shortage of petrol at Eisleban, 100 miles to the south-west of Berlin, at 5.30 Monday, 7th June, 1927, having flown a distance of approximately 3,905 miles from New York in 42½ hours. After taking in some petrol, they flew as far as Kottbus, 60 miles south-east of Berlin, landing there at 9.40.

If it had not been for running into bad storms over the English coast, there is little doubt that Chamberlin would have reached Berlin, where thousands were waiting to give him and Levine a good welcome.

This successful machine, *The Columbia*, was also a Ballanca monoplane; better observation was provided in her than in *The Spirit of St. Louis*.

Chamberlin's feat in carrying his passenger, Levine, in a non-stop flight from New York to the middle of Germany, coming so soon after Lindbergh's great lone flight, is a tremendous triumph for American aviation. The sportsmanship of this flight appeals to many of all nationalities.

Imagine a passenger wanting to fly from America to Europe jumping into a machine to travel some four thousand miles with an orange or two, a few sandwiches, and two flasks

¹ *Daily Mail* Paris Correspondent, January 19th, 1928

of soup. These he remembered to take, but he forgot his hat.

Mr. Levine deserves special praise for his great pluck and sporting effort ; this always appeals to English people, and he seems to have had great faith in his gallant pilot and their machine.

At the time of writing Chamberlin has flown a longer distance in a straight line than any man.

He has flown some 300 miles farther than Lindbergh, and in addition carried a passenger.

The Ballanca monoplane is a type heavier than Lindbergh's machine, but they had similar engines—the 200 h.p. Wright Whirlwind air-cooled radial engine.

We are informed that Chamberlin experienced bad weather for the first 1,200 miles, with a good deal of sleet. During the voyage they saw several ships—the U.S. cruiser *Memphis* was one, with Captain Lindbergh aboard, and Mr. Levine says they circled round the *Mauretania*.

Now, reader, I will ask " Neon " to explain how Chamberlin and Levine saw ships when the crew of Airship " R 34 " did not see any. Surely the airship's crew were not all blind ?

I will confide again in " Neon's " ear the real truth, and that is, Captain Scott and Commodore Maitland did not see any ships because at that particular time there were not any within their arc of vision. They may have been a little to the northward or southward of the great circle that the surface ships usually follow.

Chamberlin, in circling round the *Mauretania*, obtained a good indication of the monoplane's position, as he knew when the liner had commenced her voyage to the United States from this country. In crossing, icebergs were used to check drift, as they were almost stationary. Off the Grand Bank it was quite clear, but much fog was experienced later, and 15,000 ft. had to be climbed in an attempt to obtain clear weather but without success. This is valuable data and shows the depth of Atlantic fogs.

Chamberlin had very bad luck in running into a gale on reaching Europe, but nevertheless his flight is a remarkably plucky feat, and one all airmen join with our American cousins in being mighty proud of, not only because of the great distance flown, but because Levine is the first passenger to be carried across the Atlantic. This flight is the forerunner of a transatlantic passenger service which is bound to come in the future, and this intrepid pilot is to be congratulated on blazing the trail.

I am told Chamberlin is a master of the technique of his job, and is as modest a man as Lindbergh. He has proved to the world that a passenger can be brought by the air from America to the middle of Europe in perfect safety.

Europe having saluted Lindbergh, Chamberlin and Levine, is called upon next to greet that intrepid Arctic airman who recently flew over the North Pole, Commander Byrd. He, with three companions, Lieutenant Noville, late an officer in the American Navy, Lieutenant Balchen, late of the Swedish Royal Navy, and Mr. Bert Acosta, in a Fokker monoplane fitted with three 200 h.p. Wright Whirlwind engines, made a magnificent flight from New York to Normandy, France, 4,200 miles in 42 hours.

They experienced fog and cloud most of the way from Newfoundland, and we are informed that Byrd followed Lindbergh's route northward, and passed south of Newfoundland at 11.30 p.m.

He then struck a more southerly route than was taken by his predecessors, and throughout the flight wireless reports, giving the machine's position, arrived in England and America from steamships crossing the Atlantic.

When Commander Byrd started the weather reports were not good, and they were fulfilled when the airmen found themselves flying in a fog for more than ten hours.

The airmen neared Land's End, the most southerly point on the English coast, soon after 5 p.m., and then turned due south for Brest, France.

The log of the flight is of much interest—

Wednesday.

- 10.26 a.m. Left New York.
- 4.29 p.m. Halifax, Nova Scotia.
- 10.12 p.m. Passed south of Newfoundland.
- 11.30 p.m. Heard by Norwegian steamer *Bergensfjord*, 70 miles east of Newfoundland.

Thursday.

- 1.0 a.m. Reported their position by wireless, 200 miles east of St. John's, Newfoundland.
- 8.20 a.m. Norddeutscher-Lloyd liner *Berlin* reported aeroplane about two-thirds of the distance between New York and Paris.
- 2.0 p.m. White Star liner *Olympic* reported Byrd 517 miles west of Ushant, France.
- 5.5 p.m. Battleship *Revenge* (off Land's End) reported aeroplane overhead.
- 7.55 p.m. Reported over the Point du Raz, 40 miles south of Ushant, France.
- 8.30 p.m. Flying over Brest, France.

Byrd spent about 6½ hours in trying to locate Paris, but the weather was too thick, and after 42 hours' flying, he was forced, owing to petrol shortage, to land in the sea a few hundred yards from the shore at Ver-sur-Mer, Normandy, France.

Byrd received wireless bearings from the S.S. *Ugaland* and S.S. *Paris*. This enabled Noville, his navigator, to check their position off Cape Finisterre, and Byrd says in his opinion "it was a remarkable and efficient piece of work." He pays high tribute to the efficiency and value of wireless for checking position in these long-distance flights.

All America must be pleased, for at night¹ on the wireless news came that two more gallant American aviators, Mr. William Brock, a former air mail pilot, and Mr. Edward Schlee, a business man, left Grace Harbour, Newfoundland, at 10.14 on Saturday morning, 27th August, 1927, in a 200 h.p. Wright Whirlwind Stinson-Detroit monoplaner, *Pride of Detroit*, and flew across the Atlantic and landed at Croydon at 10.35 on

¹ Sunday, 28th August, 1927.

Sunday morning, having flown, as they were off their course a little, a distance of 2,350 miles in their first lap to fly round the world in an attempt to beat the record of 28 days, set up last year by two Americans for the quickest journey round the globe. Mr. Brock said the weather for the first 300 miles of the flight was good. Then they struck blinding rain, and had to climb 10,000 ft. to get over it. At this altitude they experienced much cold. Only two ships were sighted in the actual crossing. Then they encountered much fog, and, piercing it, arrived over South Devonshire. Being unable to ascertain their position, they dropped messages asking the name of the seaside town. The coastguard station hoisted the Union Jack, so they knew they were over England. Brock then altered course, struck the Bristol Channel, and then flew straight to Croydon.

The Pride of Detroit is a somewhat similarly designed monoplane to that used by Lindbergh, and is of the semi-cantilever type, with a totally-enclosed cabin. Between the top of the fuselage and the leading edge of the wing celluloid panels are let in to form windows. The monoplane carried a kite for release in case a forced landing in the Atlantic had to be made. This seems a wise precaution for all long-distance flights. The total petrol capacity was 250 gallons, and after the transatlantic flight there remained enough petrol for a further 10 hours' flight.

This is the first time in history that an airman has flown from America carrying a passenger to London in accordance with plan.

The further flight of these gallant and intrepid airmen to the Far East was followed with much interest.

I have dealt with north and south transatlantic flights, and now turn to the Pacific, where some good work has been done.

An attempt to fly from California to Honolulu, the capital of the Hawaiian group of Pacific islands, was first made by United States naval aircraft in September, 1925, but was unsuccessful.

But in June of last year,¹ for the first time in history, Lieutenants Maitland and Hegenberg, of the United States Army Air Corps, successfully flew from Oakland, California, to Honolulu. This distance of 2,300 miles was flown in 25 hours 43 minutes. The aeroplane used in this fine flight was a Fokker monoplane with three Wright Whirlwind engines. This machine was similar to the monoplane used by Commander Byrd in his recent transatlantic flight, and the Wright Whirlwind engine has been successful in all these recent long-distance flights.

Again, in July, two civilian pilots, Mr. Ernest L. Smith and Mr. E. B. Bronte, made a non-stop flight from Oakland, California, to the Hawaiian Islands, landing at Molokai, some 60 miles from Honolulu. In this fine flight the airmen experienced very much the same sort of weather as we had at that time in the Atlantic. During most of this 25 hours 36 minutes' flight they were in thick fog until right up to the Hawaiian Islands.

They were forced to land at Molokai, having run out of petrol. Fog should not in the usual course be a deterrent to aerial navigation. In the submarines we developed, with the aid of the scientists, a gyroscope compass that was afterwards adopted for ships' use ; so in the air the scientists should have no difficulty in evolving a suitable gyroscope compass and gyroscope controls for working in a fog or through heavy clouds, for aerial navigation.

As those of us who have for many years knocked about the coast of these islands in battleships, cruisers, destroyers, torpedo boats and submarines know well, there is nearly always a fog or mist in some part of our coasts. So I suggest the gyroscope compass needs development for air work, and I feel certain it will be as valuable to the air navigator as it is to the ship and submarine navigator.

The distance from San Francisco to Honolulu is 2,098 miles. A prize of £5,000² has just been won in a good non-stop flight of 26 hours 17 minutes from San Francisco to Wheeler Field,

¹ 1927. ² Generously given by Mr. James Dale.

Honolulu, by the monoplane *Woolaroo*, piloted by Arthur Johel and navigated by Lieutenant William Davis.

The second prize of £2,000 was won by the *Aloha*, piloted by Martin Jansen with Paul Schluter as navigator.

In the flagship H.M.S. *Swiftsure* I recollect we took 43 days to go from Callao (Peru) to Honolulu.¹ Now the airmen fly from California to Honolulu in under 26 hours !

Having dealt with some long ocean flights, we now turn to overland air work. The flights to India commenced as far back as 1918, for I recollect the late Sir Ross Smith and Squadron-Leader MacLaren flying two service Handley-Page machines, with Sir Geoffrey Salmond and Air-Commodore Borton as passengers.

When he arrived in India, Sir Ross Smith was sent on duty to report on flying to Australia, and, after making a preliminary survey of the route, reported that this flight was possible. At a later date, flying a Vickers-Vimy-Rolls machine, Sir Ross Smith, with his brother, Sir Keith Ross, and the late Sergeant Bennett, all Australians, flew from this country to Australia in less than one month ; the flying time was 183 hours 45 minutes.

Another fine flight was made by Colonel Sir Pierre Van Rynevald and Sir Quintin Brand, both South Africans, from this country, in a Vickers-Vimy biplane with Rolls-Royce engines, to the Cape. This was the first through flight, and was made in 1920. These airmen blazed the trail, completing their flight in a D.H. Siddeley Puma, which was placed at their disposal by the South African Government,² and it is hoped their good effort will lead the way to the establishment of a regular Cairo to Cape mail service.

In 1924 our very able War Minister, Mr. Stephen Walsh, M.P., accompanied by Mrs. Walsh, made some good flights in boisterous weather across the Channel and back.

I do not attach so much importance to the Air Minister, Sir

¹ Thirty-eight years ago.

² From a letter written by Captain P. D. Acland, the well-known Vickers air expert.

Samuel Hoare, being the first Minister to fly from this country to India by air in one of the newest machines belonging to the Imperial Airways, but I do attach considerable importance to a Minister flying over areas which largely come under the control of his Department. I am one of those who believe all Ministers and Under-Secretaries of State should keep in personal touch with those who have to work with them in distant lands. If this can be done with an occasional visit, so much the better.

Those who know India must have been amused at Pollen's remark¹ that had Sir Samuel Hoare timed his departure to synchronize with that of the Indian mail, there would have been only a few hours between his arrival at Delhi and that of the mails at Bombay. Why speak of Delhi and Bombay as if they were equidistant from London, whereas Delhi is many hours on by rail? As a matter of fact, Hoare arrived at Karachi on the eleventh day, whereas the mails take fifteen or sixteen days to get to Bombay, so the steamer takes 40 per cent longer than Hoare's air journey.

A saving of 40 per cent may be negligible to reactionary slowcoaches, but it is worth a good deal to business men.

Moreover, on Hoare's flight he flew in short stages and stopped by the way to hold conversations on important official subjects with the High Commissioner in Egypt, the High Commissioner in Iraq, etc., etc.

These flights that Sir Samuel Hoare has carried out to Gothenburg, to India, in Egypt, Palestine, Iraq, and now² to Oslo, Copenhagen, and other Baltic ports, are invaluable in inviting confidence in all air work, and he should be warmly congratulated upon his initiative and the good example he has set to many of his colleagues to look into their departments' responsibilities, particularly economical administration in distant places.

¹ *The Great Delusion*, page 13.

² Four R.A.F. flying boats, Blackburn *Iris*, Sanders *Valkyrie*, Short *Singapore*, Supermarine *Southampton*, took part in this memorable cruise.

The passenger flight of Lady Maud Hoare with the Air Minister to India should not be overlooked. Many women all over the world may have to travel by the air for urgent business purposes, accidents, or sickness, and I feel certain this example of Lady Maud Hoare will give confidence to thousands of women who will be called upon to make full use of air travel in the near future, not only within our Empire, but all over the world.

As I write these lines, news¹ comes from Winnipeg that Flight-Lieutenant Mawhesle, attached to the fire patrol service near Norway House, in the hinterland of Manitoba, flew with a nurse and a woman patient from Norway House to Thepas, 150 miles away.

Mrs. Laughton, the patient, fell desperately ill at Norway House, where there was no doctor available.

Arrangements were made by wireless for her to be taken to Thepas, where a successful operation was performed.

Also quite recently I notice that a 14-seater Handley-Page Napier air liner of Imperial Airways was converted into an aerial ambulance to carry a woman suffering from a spinal complaint from Paris to London.

The woman had been taking a cure at Montana, in Switzerland, and travelled from there to Paris by train on a stretcher.

Still on the stretcher, she was transferred to the air liner in Paris, and flown to Croydon Aerodrome, where a motor-ambulance was waiting to carry her to King's Cross to complete her journey by train to York. She was accompanied by her husband and a nurse.

Until people have experienced and benefited by air travel, they will naturally, being rather conservative, not make full use of this new convenience.

Again, we have to record that the great all-round-the-Atlantic Italian air pilot, the Marchese de Pinedo, completed a flight of 35,000 miles in a seaplane—to Bagdad, across India, down the Malay Peninsula, round Australia, thence to Tokyo, and from Tokyo to Rangoon, Bangkok, and Calcutta, he came home

¹ *Evening Standard*, 5th August, 1927 (Reuter).

flying the last 15,000 miles in twenty-two days. The Marchese de Pinedo holds that the seaplane is the right craft for long-distance flights.

Among the greatest long-distance flyers is Alan Cobham. Although a comparatively young man, he has flown 12,000 miles through Europe, North Africa, and Palestine ; a 17,000 mile flight to Burma and back, a 16,000 mile flight to South Africa, and, to crown his previous achievements, we saw him from the Terrace of the House of Commons bring his seaplane over the London County Council new buildings, fly up and down the Thames for a short distance, and land with much skill on the Thames, abreast the Houses of Parliament, after completing a 28,000 mile flight to Australia and back in 360 flying hours. Sir Samuel Hoare and other Members of Parliament gave Cobham a good welcome for this fine achievement carried out in the face of much difficulty. As it may be remembered, Cobham had his good and skilled mechanic, Elliott, shot by an ill-disposed person with Noahish tendencies on the outward flight.¹

Many men would have abandoned the flight after this serious misfortune. But not Alan Cobham. With the help of Sergeant Ward and Mr. Capel, he overcame all his difficulties and successfully completed the tremendous task he had undertaken.

The King bestowed upon Cobham the Knighthood of the British Empire for his great pioneer flights, and richly he deserved this honour is the opinion of his countrymen and women.

Thanks again to Sir Charles Wakefield's generous financial support, Sir Alan Cobham is now flying a Short boat-type seaplane (*Singapore*) on his 20,000 mile flight through and round Africa. He is accompanied by Lady Cobham², and all airmen are watching his fine effort with much interest.

One of my old naval airmen, Wing-Commander Pulford, took a flight of four Fairey III "D" aeroplanes last year from

¹ Elliott was shot when Sir Alan Cobham was flying over the great marsh which lies between the Tigris and the Euphrates.

² Lady Cobham is the first woman in history to cross the line (equator) by air.

Cairo to the Cape and back again, then shifted the wheels of these machines for floats and flew from Egypt to England without mishap.

This was a fine flight, and in a very interesting account of his experiences, given in a lecture at the Royal United Service Institution, Pulford said—

I have dealt with most aspects of the flight, but so far I have not dealt with navigation. We flew practically entirely by compass the whole way. On the way south between Khartoum and Malakal we followed the Nile, as it was very thick and not possible to check the position from the map. Our greatest error in position on any flight was twelve miles in a distance of 350, but this was due to having to make large alterations, of course, to avoid a number of rain storms which barred our path. The visibility made things easier, of course, but all the same I think Flight-Lieutenant Gillman, who was navigating, deserves great credit for his accuracy. I have already mentioned that we found the maps we used wonderfully correct and easy to fly by. Our compasses were carefully corrected for deviation before we left Cairo. They were swung again at Pretoria on the way south and again on the way north. We found the deviation of the pilot's compass had altered a good deal, but that of the observer's compass had not.

And in concluding his remarks, said—

We used the same engines throughout, and the last time I flew my machine the engine felt as if it could do the flight all over again quite easily.

This speaks well for the Fairey III "D" machines and their equipment of Napier engines.

"Neon" compares Pulford's fine flight with four machines to the time taken by a tramp steamer, but forgets to say the flight was not to get back to England as speedily as possible, but to survey the route for future work. No mention is made of such facts as 10 days being spent at Aboukir by Pulford in fitting floats to his machines to convert them into seaplanes before undertaking the long flight to Plymouth, which necessitated passing over large sea areas.

I would, with great respect, ask the inspirers of "Neon" if

they have ever done anything so good as Pulford's fine flight of 14,000 miles with four aircraft, each flying about 200 hours, according to programme, without changing engines and without delaying incident or accident of any kind. This is an achievement Pulford and his gallant comrades may be vastly proud of.

In the middle of May, 1927, Air-Commodore Samson took a flight of four Fairey III "F" machines, fitted with Napier Lion engines, from Cairo to the Cape and back again, covering a distance of some 12,000 miles. He completed this long flight with his four machines without any accident.

Not a great deal of attention has been called to Pulford and Samson's efforts, but in the aggregate these flights work out to something near 100,000 miles without serious mishap. Praise is not only due to the gallant pilots and crews of these two long-distance flights, but also to Mr. Fairey for keeping up his good reputation as a great aircraft constructor. His successful aircraft works show that the good nursing given to him in the early days has borne refreshing fruit.

Samson has now been flying nearly 18 years, and when I caught a glimpse of him near the Pyramids last year¹ he looked in the pink of condition. His fitness challenges the opinion often expressed that a man can only fly for a very few years.

The first attempt to make a non-stop flight from this country to India falls to Flight-Lieutenant C. R. Carr, one of the most intrepid pilots in the Royal Air Force. He is a New Zealander, and I recollect accompanied Sir Ernest Shackleton in his last expedition to the South Pole as the pilot of the Avro machine the Antarctic explorer took with him.

Carr was accompanied in his attempted flight to India by Flight-Lieutenant L. E. M. Gillman, who was one of Pulford's gallant little band in the first service flight to the Cape from Cairo.

After Carr had taken off at Cranwell to commence his long

¹ 1927.

flight, all went well until over Anatolia, where they encountered a blinding rain storm, near Bagdad they experienced a heavy sand storm with strong head winds, and when about 45 miles S.S.E. of Bundar Abbas and within three miles of Quoin Light they were forced by engine trouble to come down into the water, and were rescued by Sheikh Mohamed Nizan, the lighthouse-keeper, having flown by Mercator's chart a distance of 3,419 miles in 43 hours 35 minutes, while they reckoned the actual flying distance was 3,600 miles. This was a most gallant attempt, and neither Carr nor Gillman need mind the failure, few could have done better. Three times Carr has made this attempt to fly direct to India, but each time bad luck has overtaken him. He richly deserved the Air Force Cross bestowed upon him in this New Year's Honours List.¹

The machine used by Carr is the Hawker-Horsley, fitted with a Rolls-Royce 670 h.p. Condor engine, and in this flight it is interesting to compare Carr's 3,419 miles with Lindbergh's 3,700 miles. In distances on the arc of the great circle, there is no very great difference between the two flights.

An interesting flight of six machines from Nos. 27 and 60 Bombing Squadrons, from Risalpur to Calcutta and back, was carried out early this year. The route followed was Risalpur-Ambala-Cawnpore-Patna-Calcutta, a distance of 1,400 miles. On the return journey, landings were also made at Delhi and Lahore. The outward journey took five days (18 hours 5 minutes' flying) and included one day's rest at Patna, while the homeward journey occupied six days (17 hours 50 minutes' flying), the aircraft being delayed one day at Ambala owing to the waterlogged state of the aerodromes ahead.

During December and January a flight of No. 28 (A.C.) Squadron carried out two months' co-operation with the Army at Poona, Mhow and Jhansi. These stations are all over 800 miles distant from the squadron's base, and it is satisfactory to note that no failure of any kind occurred during the co-operation.

¹ 1928.

A fine flight was made, as a passenger, by Mr. Black, an American, the principal owner of the *Baltimore Sun*, from Croydon to the Dutch East Indies and back, a distance of 20,000 miles.

This was a sporting undertaking made in an ordinary commercial aeroplane that had made many long flights, and Mr. Black is to be warmly congratulated on his successful trip.

Some German airmen made a gallant attempt in a non-stop flight from Germany to America on the 14th August, 1927, in two Junker's monoplanes. Bad weather, with thick fog and thunderstorms, was experienced soon after the flight had started, and the pilots wisely abandoned the attempt. But German flying men, who have faced war risks, are not easily discouraged, and whilst in this country we have to mourn the sad loss of a very gallant pilot, Captain Hinchliffe, and Lord Inchcape's most courageous daughter, the Hon. Elsie Mackay, who attempted a transatlantic flight on 13th March, 1928, I have to record that the German Junker's monoplane *Bremen*, fitted with a J,310 h.p. engine, left Baldonnell Aerodrome, near Dublin, at 5.30 a.m. on Thursday, 12th April, 1928, and landed at Greenly Island in the Straits of Belle Isle at 11.6 p.m. on 13th April. When within 900 miles of the Newfoundland coast a terrific blizzard was experienced, which lashed the machine from port to starboard, and made the keeping of an accurate course difficult. During the night the electric light for illuminating the navigating instruments failed and the aeroplane was steered too much to the northward. From a study of the chart it would appear that the airmen made a landfall near St. Lewis inlet, and later they were fortunate in picking up Greenly Island lighthouse with a small ice-covered lake to land upon. The petrol of the *Bremen* was almost exhausted, which shows the stiff fight these gallant flyers made against the grim elements that defeated the courageous Colli, Nungesser, Minchin, Hamilton, Hinchliffe, and Miss Mackay.

Had the machine not been in the hands of a very skilful

night-flying pilot, such as Captain Köhl, ably assisted by Commandant Fitzmaurice, of the Irish Free State Air Force, it is doubtful if this fine flight, with Baron von Hünefeld as passenger, could have been accomplished. We must accord our heartiest congratulations to these intrepid airmen for being the first to blaze the trail across the Atlantic from East to West.

The wonderful welcome given to them by the Americans and their fellow countrymen in the United States showed what is thought of this great flight, which now becomes a leading mark in transatlantic air history.

Aviators approaching our coast from the eastward should always remember that the sheltering effect of our land produces rather a predominance of local east winds on the East Coast itself.

But roughly at 1,000 ft. altitude, and neglecting the days when the surface winds are less than 20 miles per hour, the west wind blows over the North Sea twice for every once that it does from the east. At 1,000 ft. on these occasions the wind velocity is from 30 to 40 miles per hour.

The late Admiral Sir Lewis Beaumont tried the southern route in summer in an attempt to sail from Portland to Bermuda with the old Training Squadron, consisting of the corvettes *Active*, *Volage*, *Calypso*, *Ruby*, and we experienced nothing but westerly winds and, finally, had to "about ship" and run back to Plymouth, having been 41 days at sea from Portland out into the Atlantic and back to Plymouth.

Transatlantic fliers from Germany would do well to notice this, as so much depends on making a good start in these long flights. It may happen that they would start with an easterly wind near the surface and find at 3,000 ft., when entering the Atlantic, a 40 mile per hour westerly wind dead in their teeth, according to which route they take, the northern or one more to the southward. Their speed for a considerable part of the outward journey might be cut down by 20 miles per hour. In such a case, it would pay the aviator to drop

right down and fly nearer the surface of the ocean to take advantage of the change of direction which does occur with change of altitude. A good air navigator, by using his drift indicator, can ascertain approximately the speed over the water, and the angle the wind is drifting him, and in this way determine the most suitable altitude for maximum speed. To be retarded a few miles per hour in a transatlantic flight may mean all the difference between success and failure. From a study of the small data available, it would seem better to fly at 10,000 ft. from Newfoundland to Europe, to take full advantage of the westerly winds, and at a much lower altitude from Ireland to Newfoundland.

Another unique flight is that of Captain Wilkins and his pilot, Lieutenant Eileson, across the North Pole from Port Barrow, Alaska, to Spitsbergen. Captain Wilkins is an Australian, and well known as a very experienced and resourceful Arctic explorer. He accompanied the late Sir Ernest Shackleton in the *Quest* expedition to the South Polar regions. This Arctic flight stands out as a very great achievement in air history, and still more so as it was accomplished with a small Lockheed monoplane, fitted with a 220 h.p. Wright Whirlwind engine.

At a meeting of the Royal Geographical Society, Sir Charles Close announced that the following telegram had been sent to Captain Wilkins: "The Council of the Royal Geographical Society warmly congratulate you and Eileson on the remarkable feat of navigation and airmanship over the unexplored Arctic."

The French Cabinet have been recently considering the question of transatlantic flights. It was decided that any machine which was used in an attempt to cross the Atlantic ought to be able to float on the water in case of a forced descent. For this reason, French Army machines of existing types were ruled out.

I think this is a wise ruling. Even if fabric floating bags are used in the fuselage, the machine should be able to float for some days and give the pilots a chance of being picked up by

a passing steamer should they be obliged to make a forced landing on the open sea. The greatest danger in the long-distance flights is that the machine is very much overloaded, takes a longer run to get off, brings a greater strain on the engine, and, if she has to come down in the overloaded condition, has to land faster. In all long-distance flights over sea, kites and wireless telegraphy should be used to indicate the position when a forced landing has to be made.

Byrd's machine must have been very heavily loaded, as he carried three men and also wireless, and he had provided for every emergency in the way of a collapsible boat, food, medical first-aid equipment, etc.

Lieutenant Costes and Captain Rignot, two highly-skilled French pilots, flew from Paris to Jask, in Persia, a distance of 3,390 miles, in 32 hours ; this was a record non-stop flight to March, 1927.

On 17th October,¹ without any ceremony, four large all-metal Supermarine Napier flying boats, each fitted with two Napier Lion engines, left Plymouth on an Empire tour which will occupy about a year or more, and which will cover a total distance of some 25,000 miles. Flying in perfect formation, they proceeded from Plymouth to the French Seaplane Station at Hourtin, near Bordeaux, and then flew overland to the Mediterranean Seaplane Station at Berre, thence following the coastline to Italy. The Empire route then continues via Naples and Brindisi to the Suez Canal, then across the 150 miles of desert to the Euphrates. From the Persian Gulf, the route will lie over water, for after Karachi the squadron will undertake the first cruise yet made along the coast of India, calling at Colombo, Ceylon, and then at Calcutta. Afterwards they will proceed via Akyab and Rangoon to Singapore, and by way of Batavia to the northern coast of Australia. They will cruise round the Australian coast, calling at Freemantle, Adelaide, Townville, and so back to Singapore, where they will remain for three or four months, and where a flying boat base is to be

¹ 1927.

established. They will then make a further cruise in Eastern waters which will last to January, 1929.

These four flying boats are under the command of Group-Captain H. M. Cave-Brown-Cave, D.S.O., D.F.C., with Squadron-Leader G. E. Livock, D.F.C., second in command. There are six pilots in the flight, besides mechanics, riggers and wireless operators. Outside the Mediterranean there are no seaplane bases, although at various points on the route there are R.A.F. stations. The boats are fitted with collapsible bunks for the crews and with cooking apparatus, and they carry an equipment of spares. Extra tanks have been fitted in view of the long stages which will have to be flown.

On 15th December they arrived at Bombay from Karachi, completing the 560 miles in seven hours, the total distance covered to Bombay being 5,560 miles. Air Vice-Marshal Sir Geoffrey Salmond, who flew in one of the machines, described the flight as one of the most perfect he had ever made.

In December, 1927, the intrepid French airman, Captain Costes, with Lieutenant Le Brix, made a record South Atlantic non-stop flight on their Breguet XIX, 500 h.p. Hispano-Suiza engine. The flight of 2,000 miles took them 20 hours. They then flew from Santiago (Chile) to La Paz (Bolivia) in 12½ hours, the distance being 1,200 miles. Their record trans-andes flight was a part of the flying tour they have made of the principal cities of South and North America, returning to Paris via Tokyo.

Lindbergh made one request at the termination of his trans-atlantic flight, and that was : Would somebody cable to Mrs. Lindbergh, his mother, to say he was safe ? A simple request, but it meant much to both.

It has been my privilege in the many air posts I have held, covering rather a difficult period, to have to interview many mothers, many wives, and other relatives of our gallant airmen. Sometimes I have had to explain the risks a young fellow would have to face if he desired to become a pilot. On other occasions

I have had to break the sad news of the loss of a dear one in peace and during the war, or convey the sad tidings of a serious hospital case.

"Neon" has no knowledge of this sad side of flying. The sadness of it all was sometimes almost overwhelming, and I trust no friend or even enemy of mine, nor even the Noahs, will ever have to go through what General Henderson and I had to in the early days of flying.

Mr. Pollen would not have said the airmen's contribution to victory was difficult to find, or "Neon" have made such harsh criticism on air effort had they paused to think.

Many of the flying lads' contribution to victory in the Great War was their bright, fresh young life, and I have had to break the sad news to their relatives. The braveness of the mothers and wives of airmen, not only during the war but before, I found simply superb, and after some years of experience I take off my hat to the relatives of our airmen and also those who serve in submarines. They know the risks their men take, they often wait and wonder for hours, for days, in an agony of anxiety—and when it is over smile brightly or face the loss that sometimes occurs with much fortitude and no murmurs.

Mrs. Lindbergh, in the tribute paid to her son, was delightful. She refused special arrangements for travelling to Washington, went to the White House, was received by the President, took part in the fine welcome to her son, and returned to her chemistry teaching, in the High School at Detroit, as if nothing out of the ordinary had happened. She declined certain trust funds that kind and generous people in America tried to arrange for her future comfort, and, like her son, declined to be swept away by success.

I fancy the way Lindbergh handled the laurels he won must be in no small way attributable to Mrs. Lindbergh. It was a kind thought on Lindbergh's part in going to call, when in Paris, on the mother of the brave French airman, Madame Nungesser. Her son and Mr. Coli were lost in their gallant

effort to fly the Atlantic from Paris to New York. Certain Americans clubbed together and raised a considerable sum to give the mothers of Major Nungesser and Mr. Coli a snug little pension. This was a most thoughtful action, and whoever these generous Americans may be they earn the gratitude and warm thanks of all airmen.

Knowing that the womenfolk bear their anxiety with great bravery when long flights are being made, let us turn for one brief moment to the Noahs, and see what they do on reading reports of long flights in the daily papers. One can picture them after a nice generous luncheon at the Senior,¹ or some other equally distinguished club, in a large armchair, sipping their coffee, and smoking big cigars. One says—

“What in the devil is the use of these long flights? Stupid fools I call these flying men. What! What!” Another Noah: “They call one the flying fool. In my opinion they are all flying idiots, men weren’t meant to be birds, tut, tut.”

The knowing Noah chipping in, “But this last idiot is a Byrd. Ha! Ha!” Another Noah: “No, he isn’t. His name is Brock, belongs to the Brocks, the firework people, I suppose. I hate fireworks, only fit for flappers.” Sniff! Sniff!!

I will inform these Noahs, who never risk themselves and never will, of the value of these long flights.

Technically, these flights are of the greatest value, as they test the reliability of the structure of the whole machine with its controls; they prove that modern aero-engines are efficient, with a low weight per horse-power, consumption of petrol is small, that their lubrication system is good, as they can run for a considerable number of hours without attention; they prove that the propeller, whether laminated or metal, is built on sound principles; according to speed of flight, they prove the engine is giving its proper power, and the efficiency of the propeller with regard to pitch, centre of pressure in relation to leading and trailing edge, is designed correctly from the mathematical data available. They prove that the propeller

¹ Senior United Service Club, Pall Mall, London.

boss is fixed to the machine in an efficient manner, and many other technical points of detail, not necessary to enter into, such as petrol capacity, etc. These flights are valuable in ascertaining the flying conditions over great areas, best system of providing aerodromes, food supplies, supplies of petrol, lubricating oil, spare parts, etc. They give undoubtedly more confidence in flying, and focus the attention of the whole world on the fact that the human race is not deteriorating in courage, nerve, endurance, initiative, sportsmanship, or engineering skill. Most people, except "Noahs," and maybe secretly some of them do, admire these skilful and resourceful long-flight aviators.

Before the *American Girl* set off for Paris, seventeen pilots and passengers had disappeared on long-distance flights in 1927. Here is the list—

A Frenchman, Air-Lieutenant de St. Roman, was lost while flying across the Southern Atlantic to Brazil.

Two Frenchmen, Captains Nungesser and Coli, were lost on the Atlantic flight from France to America.

The *St. Raphael*, which left Upavon for Ottawa, with Princess Lowenstein-Wertheim, Colonel F. F. Minchin, and Captain L. Hamilton.

The *Old Glory*, with two pilots and a passenger.

Three aeroplanes disappeared on transpacific flight ; seven persons missing, including passenger, Miss Mildred Doran.

Mr. Redfern, an American airman, lost on a flight to Brazil.

Consequently we were all much relieved when the following wireless message was received from Miss Ruth Elder : " Came down near S.S. *Barendrecht* with broken petrol-feed pipe. Both Haldeman and I are O.K."

This ship was a Dutch trawler, and was about 600 miles from Land's End, which shows that the gallant American aeronautette, Miss Elder, and her pilot, Captain Haldeman, had flown some 2,600 miles, or about three-quarters of their journey to Paris. They must have had a very anxious time before being picked up, and we should admire their great pluck.

Miss Elder is a trained pilot and can handle a machine with great dexterity. She can do stunts in the air quite as well as experienced pilots. One of the most famous pilots' organizations in America has adopted her as an honorary member.¹ This is a big compliment to a brave woman.

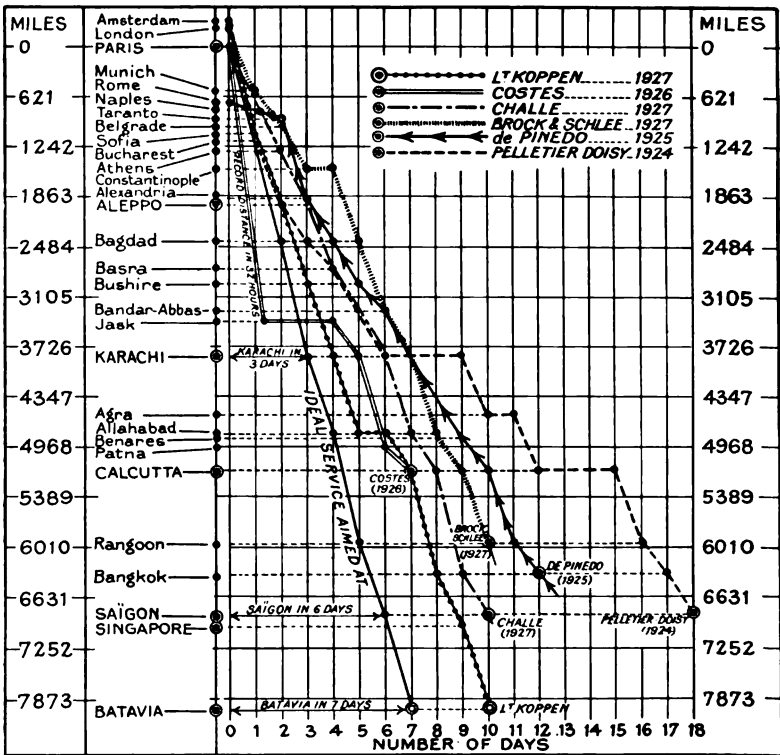
Now a word about the seventeen missing. The Noahs allude to a "Suicide Club," and darkly hint that those who attempt to fly the Atlantic must be mad.

I hold the opinion that those who attempt to fly the Atlantic should be in the very pink of condition, like Lindbergh, otherwise disaster is certain to overtake them. The machines should carry fabric floating bags in fuselage, wireless telegraphy, and kites if possible, and the pilot should possess a recent medical certificate as to physical fitness. The call of the air is analogous to the call of the explorer or mountaineer. Disaster sometimes overtakes them, but not always!

Should transatlantic flights be stopped? I think not. The progress of all human effort is made up of failures and successes, but gradually the successes outnumber the failures, until the latter become almost microscopic. In that way progress lies, and the relatives of our seventeen missing airmen and airwomen must take comfort in the knowledge that they belong to that class of humanity, who are not content to sit still, but press for progress. They often want to forge ahead a little too quickly. But their failures may give renewed impetus to our air designers and constructors to give us something better. The Schneider Cup speed in 1927 of nearly five miles a minute, is an indication of the progress being made, and when higher speeds are available for cross Atlantic flights, which before long they will undoubtedly be, we shall be making forward progress towards the regular transatlantic air time-table that our veteran great shipbuilder, Sir Alfred Yarrow, foresees.²

We do not desire to discourage those who wish to fly the Atlantic. Our great achievements of the past have always involved some risk and occasionally loss of life. Only very fit

¹ *The Nation*, Vol. 125, No. 3255, page 570. ² Page 388.



(From "Flight")

COMPARATIVE NOTES ON THE BIG FLIGHTS TO THE EAST

pilots should attempt these transatlantic flights and when the meteorological experts advise that the weather is favourable. Few can doubt that these Atlantic flights are the forerunners of a transatlantic air service which will be as regular as our very efficient cross-channel air service. In the recent¹ severe weather, Imperial Airways kept up a fine service, and had to put on extra machines to cope with the additional number of passengers thrust upon them by the total suspension of the cross-channel boat services due to the heavy gales. May I call the attention of Pollen and "Neon" to this simple fact, which cannot be disputed.

In my opinion, these aviators are just as courageous as the great explorers of the fifteenth and sixteenth centuries, such as John Cabot, Columbus, Sebastian Cabot, Vasco Da Gama, Magellan, Drake, Raleigh, Frobisher, Hudson, and the many gallant lesser-known men who lost their lives in the numerous small vessels that were wrecked in those early days of exploration.

The flights of Koppen, Costes, Challe, Brock and Schlee, de Pinedo, Pelletier Doisy, as shown on Plate 55b, are all great efforts.

But Bert Hinkler's lone flight from Croydon to Port Darwin, Australia, in 15½ days, will require some beating. His machine was an Avro-Avian,² with a Cirrus engine of 30-80 h.p. Hinkler in this fine feat puts up four records: Longest flight in a light aeroplane, at a cost of approximately 2½d. a mile. Longest solo flight. First non-stop flight from London to Rome. Fastest journey ever made from England to India.

These aviators prove that, with a close study of aerial navigation, long flights can be made, either lone or carrying passengers, with perfect safety.

They stimulate the industry of all countries to produce the most efficient machine that the aeronautical science of the day

¹ December, 1927, and January, 1928.

² Built by A.D.C. Aircraft, Ltd., Croydon Aerodrome.

is capable of, and, men like Hinkler, blaze the trail¹ for this and future generations to develop into a network of great commercial air routes throughout our Empire and throughout the world, in exactly the same way as the gallant men of the Elizabethan age pointed out new lands that generations who came after them did develop with great success.

¹ LOG OF HINKLER'S GREAT LONE FLIGHT TO AUSTRALIA IN 15½ DAYS

Date.	Route.	Distance in Straight Line.	Total.
Feb. 7.	London-Rome	900	900
Feb. 8.	Rome-Malta	420	1,320
Feb. 9.	{ Malta-Benghazi }	650	1,970
Feb. 10.	{ Benghazi-Tebrok }	650	2,620
Feb. 11.	{ Tebrok-Ramleh }	650	3,270
Feb. 12.	Ramleh-Basra	800	4,070
Feb. 13.	Basra-Jask	700	4,770
Feb. 14.	Jask-Karachi	600	5,370
Feb. 15.	Karachi-Cawnpore	600	5,970
Feb. 16.	Cawnpore-Calcutta	600	6,570
Feb. 17.	Calcutta-Rangoon	750	7,320
Feb. 18.	Rangoon-Victoria Point	450	7,770
Feb. 19.	Victoria Point-Singapore	750	8,520
Feb. 20.	Singapore-Bandoeng	600	9,120
Feb. 21.	Bandoeng-Bima	850	9,970
Feb. 22.	Bima-Port Darwin	970	10,940

In each case the distance flown over has been much greater and totals about 12,000 miles. At an average speed of 90 m.h.p. this means a total flying time of 134 hours, or six days, continuous flying night and day.—*Evening News*, 22nd February, 1928.

CHAPTER XIV

THE SCHNEIDER CUP RACE, 1927

And skill's a joy to any man.

JOHN MASEFIELD, *The Everlasting Mercy*.

THE first successful seaplane with twin floats to be flown in this country was developed at Barrow-in-Furness in the autumn of 1911, by the naval airmen during the construction of Rigid Airship No. 1.

At that time Commander Swann¹ asked my permission to use some of the crew of the *Hermione*, then under my command, for help in carrying out experiments with a private aeroplane that he contemplated purchasing. This I readily granted, provided he did not interfere with the airship work. A hangar was provided, and Messrs. Vickers gave permission for it to be erected on the edge of Cavendish Dock by arrangement with the Furness Railway Co.

Commander Swann purchased an Avro biplane for £700, and had various types of floats fitted for converting it into a seaplane to rise from the water. This work became rather expensive, as he had to pay Messrs. Vickers's men privately, and gradually the expenses became too high for one person to bear. Also, Commander Swann wanted to interest others in his venture, so a syndicate was formed, consisting of Commander Swann, Commander Masterman, Lieutenant-Commander Boothby, Engineer-Lieutenant Randall, Mrs. Sueter, and myself, to finance further float experiments to prevent them fizzling out.

These are outlined in a paper I prepared, dated December, 1911, and sent to Lord Rayleigh's Advisory Committee on Aeronautics, and it is now one of that body's official publications, No. 69. These are, I believe, the first recorded series of

¹ Now Sir Oliver Swann, K.C.B.

experiments in any country with twin-float seaplanes, and, as this paper is of interest to those who study the evolution of different types of aircraft, I publish it in Appendix III. Commander Swann at that time had little experience in handling a machine in the air, but it is, I think, beyond dispute that he is the first man in this country to get off the water in a twin-float seaplane and fly a short distance.

This machine was flown with greater success at a later date, without any alteration being made, by a very skilled pilot—Major Sippé¹—which showed we were on right lines. The results of our experiments we made public, and I think it right to record that the experience we gained in trying many different types of floats, methods of construction, staying them, etc., with Commander Swann's Avro machine, fitted with a low-power Green engine, were of great value in guiding us at a later date in developing twin-float machines for the Royal Naval Air Service.

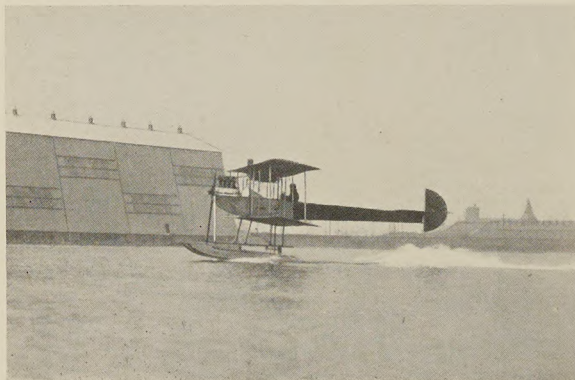
Mr. A. V. Roe is now one of our ablest aircraft constructors ; he has been at air work from the beginning, and has borne much of the burden of pioneer air work in this country. All through his successful career his designs have been of a high order, largely due to the immense amount of work and good supervision he has put into all he has undertaken. Also he is the designer and builder of the Avro-Avian machine that Bert Hinkler flew so successfully from Croydon to Australia in 15½ days.

The speed of our Avro seaplane probably was not much more than forty miles an hour. Plate 56 shows the machine on the surface of the water, in the air, and upside down in the Cavenish Dock during one of the many float trials, in which Commander Swann received more than one ducking. In other pages I have mentioned how we developed the boat-type seaplane at Felixstowe from the Donnet L'Evêque and Sopwith bat boat types, to which were added the two Curtis Atlantic

¹ The same gallant pilot who made the fine flight to Friedrichshafen in the Great War.



FAILURE



SUCCESS •



EXPERIMENTS WITH COMMANDER SWANN'S "AVRO" SEAPLANE AT BARROW, 1911-12

type seaplanes that I purchased with Admiralty approval and by the courtesy of Mr. Wanamaker,¹ who was financing the first attempt at a transatlantic flight. These machines were built by Mr. Glen Curtis at Hammondsport, and at that time Commander Tower, of the United States Navy, with Commander Porte, rendered him some assistance. I gave Commander Porte these boat-type seaplanes to develop at our Felixstowe naval air station during the war, which he did with great success.

Both twin-float and boat-type seaplanes have been flown in many air races since their inception.

The first seaplane race was held at Monaco on the 31st March, 1912. Twin-float machines were used by Voisin, M. Farman, H. Farman, Sanchez Besa, and Nieuport.

In April, 1912, Messrs. Short Bros. completed a twin-float seaplane which successfully flew at the Naval Review on 12th May, 1912. This seaplane may be regarded as the forerunner of the standard type of Short seaplane used with so much success throughout the War period for reconnaissance, bomb and torpedo dropping, as briefly recorded in these pages.

The shape of the Short float is not unlike our final Barrow design as shown in Appendix III and in the photograph of the Avro machine in flight when piloted by Major Sippé. (Plate 56.)

In 1912 M. Jacques Schneider, an air enthusiast, presented to the Aero Club, of France, the Schneider Maritime Aviation trophy, with a view to develop high-speed, seaworthy seaplanes. The cup is valued at one thousand guineas. At that time seaplane flying was in its infancy but M. Schneider, being a very keen sportsman, saw that there were great possibilities in seaplane development, and desired to encourage this particular branch of aviation.

There can be little doubt that the establishment of this trophy has influenced designers, constructors, and engineers in doing their utmost to develop high-speed seaplanes, and M. Schneider

¹ The late Mr. Rodman Wanamaker, who was much respected by all air-men for his fine support of all air effort in America.

deserves the warmest thanks of all those who are interested in air development for his enterprise in presenting his trophy. (Plate 57.)

The race last year (1927) was held at Venice ; the seaplanes were moored out for the test of seaworthiness at the Lido. This was passed satisfactorily by all the competitors. It was unfortunate that the race had to be postponed from Sunday, 25th October, to Monday, 26th October, as we were informed 250,000 spectators were disappointed when enthusiasm was at its highest point.

The huge crowds at the Lido were most well conducted, and to see a handful of Fascists control thousands was illuminating, and showed up well the efficiency of Signor Mussolini's administration.

Many of the visitors slept all night on the sands, and a regular fleet of gondolas, motor-boats, and steamers plied between the Lido and Venice. All day the Square of S. Marco was packed almost to overflowing ; the poor pigeons had a bad time, as they could get little food from the ever-generous public, and they were in much danger from being trampled upon.

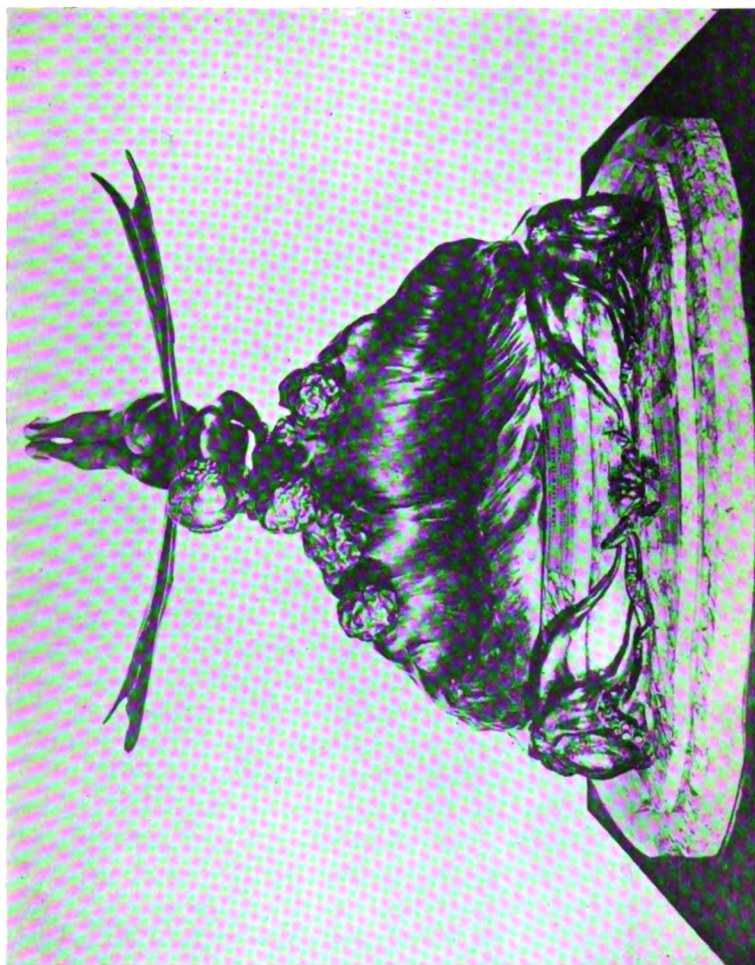
I am convinced our feathered friends, beloved by all airmen for having been the means of saving more than one pilot's life in the war, hate Schneider Cup races being held at Venice, and would, I feel certain, beg Signor Mussolini, when next the Schneider Cup Race is held in Italy, to choose Naples, as they much prefer to be fed liberally, fly and strut about S. Marco Square, their lawful domain, in peace.

On a stone of the pavement of this Square, some 20 ft. from the right-hand supporting column to the entrance arch of the Church of S. Marco, is chiselled this simple inscription—

BOMBA
AUSTRIACA

4-9-16

Surely this is the most perfect piece of sarcasm it is possible to find.



SCHNEIDER TROPHY

In all, some 620 bombs were dropped on Venice during the War, but, fortunately, little damage was done to the historic fabrics. What the Austrian airmen sought to achieve by bombing Venice is difficult to discover. If they wanted to destroy the celebrated bronze horses they would have been disappointed, because they were removed to Rome during the war period. Most airmen regretted the bombing of Venice as a deplorable act of vandalism on the part of some Austrian pilots.

I saw thousands of people give the celebrated all-round Atlantic airmen, Marchese de Pinedo and Major de Bernardi, the winner of the 1926 Schneider cup from the Americans, a most hearty greeting. Pinedo arrived in his most interesting Savoia flying boat, the *Santa Maria*. She was moored in the lagoon, and looked as if she would stand a good sea. A large screen was erected in S. Marco Square, the opposite end to the Campanile, and a film showing Pinedo's great 26,000 mile flight round the Atlantic was shown to a most appreciative audience that filled the Square. It struck me that air propaganda of this nature was highly commendable and most valuable.

Sir Philip Sassoon, the Under-Secretary of State for Air, flew from Lympne to the Lido, and he told me he had a delightful flight, doing the journey in just 6½ hours. He pleased the Italians very much in a graceful speech he made at the official luncheon given just before the race, and in his remarks said : " Perhaps I may be pardoned for hoping that the best pilot and best machine may be English."

Colonel O'Gorman was the official challenger in the 1927 race and, needless to say, with this able, tactful man and Commander Perrin, the hard-working and efficient secretary's good help, everything from the Aero Club side went uncommonly well.

To return to the Schneider Cup Race. Heavy seas rolled up the Lido beach all Sunday, 25th October, and six of the most distinguished pilots in the world were waiting with some anxiety for the weather to moderate.

On the next page is an extract from the official programme.

VELIVOLI E PILOTI
PARTECIPANTI ALLA " COPPA SCHNEIDER, 1927 "

SQUADRA ITALIANA

Idrovolanti : " Macchi 52 " monoplano ;
Motore " Fiat AS 3, " Potenza nominale h.p. 700 ;
Potenza effettiva h.p. ?

Piloti : Magg. DE BERNARDI MARIO.
Cap. FERRARIN ARTURO.
Cap. GUASCONI GIOVANNI.
Cap. GUAZZETTI FEDERICO.

SQUADRA INGLESE

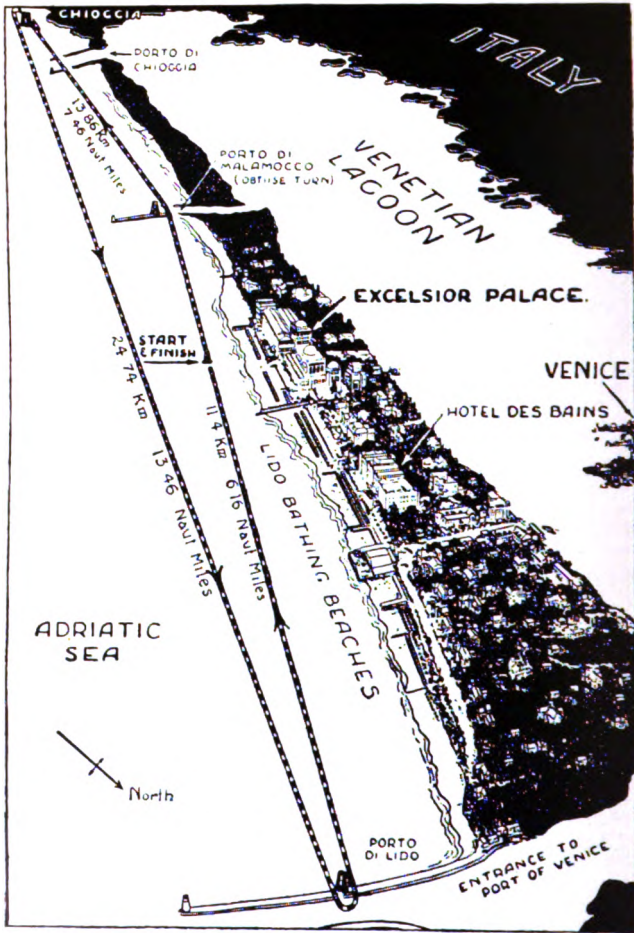
Idrovolanti : " Gloster IV " biplano ;
Motore " Napier-Lion " Potenza nominale h.p. 625 ;
Potenza effettiva h.p. ?
" Supermarine S 5 " monoplano ;
Motore " Napier-Lion " Potenza nominale h.p. 625 ;
Potenza effettiva h.p. ?
" Supermarine S 5 s " monoplano con fusoliera accorciata ;
Motore " Napier-Lion " Potenza nominale h.p. 625 ;
Potenza effettiva h.p. ?
" Short-Bristol-Crusader " monoplano ;
Motore " Bristol-Mercury " derivato dal " Jupiter 450 h.p. " ; Potenza nominale h.p. 800 ;
Potenza effettiva h.p. ?

Piloti : L. H. SLATTER.
S. M. KINKEAD.
S. N. WEBSTER.
O. E. WORSLEY.
H. M. SCHOFIELD.

SQUADRA AMERICANA. (Ha deciso di non partecipare)

Idrovolante : " Kirkham " biplano ;
Motore " Packard " X 2750-24 cilindri ;
Potenza nominale h.p. 700 ;
Potenza effettiva h.p. ?

Pilota : WILLIAMS.



THE SCHNEIDER COURSE

An air-view sketch of the Lido

Fortunately, Monday broke fine and the heavy sea and swell gradually subsided. In the afternoon the sands at the Lido were covered with thousands and thousands of spectators—some sat on chairs in the sea, others climbed on the bathing machines, every position of vantage was taken in the various hotels to see the great race.

The triangular course at the Lido is 21.8 miles with 21 turns, and the course is right along the beach, so a splendid view of the race was obtained from the balconies of the Excelsior Hotel.

The race commenced at 2.30 p.m. and six machines started, as decided by lot, at short intervals, in the following order—

1. Flight-Lieutenant S. M. Kinkead (Britain) on a Gloster.
2. Major de Bernardi (Italy) on a Macchi 52.
3. Flight-Lieutenant S. N. Webster (Britain) on a Supermarine S 5.
4. Signor Guazzetti (Italy) on a Macchi 52.
5. Flight-Lieutenant O. E. Worsley (Britain) on a Supermarine S 5.
6. Signor Ferrarin (Italy) on a Macchi 52.

The seaplanes took off the water at the air post of the lagoon. The starting line had been fixed at the hotel end of the Lido, then straight towards Malamaocco, where the first pylon was erected. This turn was about 12 points (135°). From Malamaocco the course was towards the second pylon on Scotto Marina, near Chioggia; this turn is an acute angle of about two points (22° 30'). The third pylon was placed on the Porto di Lido, giving a turn of about the same angle.

In glancing at Plate 58, which I take from *The Aeroplane*, it will be seen that on the way the pilots negotiated the turns would depend, to some extent, the result of the race had there been a very close contest. As far as I could see, Kinkead took his corners closer than Webster, with much the same moderate bank. After completing five laps, Kinkead was forced to descend in the sea through the spinner on the airscrew boss of the Gloster becoming cracked. This caused the machine to

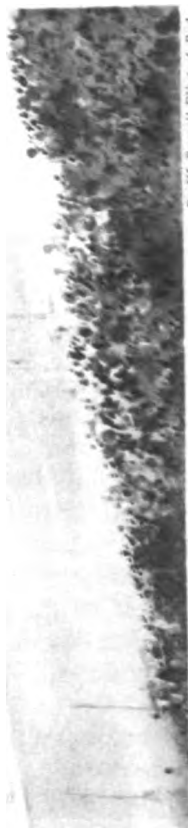
vibrate badly, and Kinkead¹ was wise to come down when he did, as Air-Marshall Scarlett informed us at the official luncheon that, had he gone much farther, disaster might have overtaken him. De Bernardi took one second longer than Webster in completing his first lap and then, to our amazement, did not reappear ; he had been forced to come down in the sea through engine trouble, and was towed back by a patrol boat belonging to our seaplane cruiser, H.M.S. *Eagle*, which was then lying in the outer anchorage.

Webster won the race in fine style by completing the seven laps at an average speed of 281.669 miles per hour, in his supermarine Napier S 5 (geared engine). In the fifth lap a part of his cowling came adrift, but this did not prevent him finishing the race without further mishap. Guazzetti completed six laps and then suffered through a petrol joint giving out ; the petrol blinded him just after he rounded the Porto di Lido pylon, and I saw him make straight for the Excelsior Hotel, which I feared he would collide with, but by a superhuman effort he cleared and landed safely in the lagoon. Not only is Guazzetti a great pilot, but he proved himself a master of the emergency in the way he handled his machine after this mishap to his petrol installation occurred. Worsley completed the course, flying his supermarine Napier S 5, with ungeared Napier engine, at an average speed of 273.088 miles per hour, and thus secured second place in the great race, and easily beat all records.

Captain Ferrarin, on his Macchi 52, was undoubtedly the favourite, but he had the great misfortune to have two of his pistons damaged just after he started. All the spectators were very sorry indeed for his disappointment in being knocked out so early in the race.

I have witnessed many air races, but I have never seen so many spectators genuinely interested in an air contest. Webster

¹ All Members of Parliament were deeply grieved when the Air Minister announced during the Air Debate on 12th March, 1928, that this very gallant and distinguished pilot had lost his life in making a high speed test with a Schneider Cup type machine over Southampton Water. Our profound sympathies went out to Kinkead's relatives.



By W. Russell Flint, A.R.C.

FLIGHT-LIEUT. WEBSTER WINNING THE SCHNEIDER CUP
AT THE LIDO, 1927

put up a really wonderful flight ; he kept a very level course and took his many turns well. This race is a great test of human endurance, but Webster, by doing a few stunts after he had secured the trophy, showed he was wonderfully fit. (Plate 59.)

He flew seven times round the triangular course of 218 miles, averaging 281·669 miles per hour. I watched the figures go up on the timing board, and it looked as if Kinkead in one of the laps had reached a speed of 289½ miles per hour, but I understand this figure was altered after I left the course, as an error had occurred in the timing.

Kinkead took his corners uncommonly well, and I should imagine our pilots lost little speed in rounding the two extreme pylons, whilst the Italians in cornering increased altitude and turned on one wing. In this way they must have lost speed, which could scarcely have been regained in the spectacular dive that followed.

The reader will notice that in recent years air speeds have steadily increased. Twenty years ago Santos-Dumont was flying at 25 m.p.h., Henri Farman at 30 m.p.h., and a year later Wilbur Wright at 39 m.p.h. Schneider Cup speeds are of great interest in showing this progress, as can be seen in the following table—

	Pilot	Machine	Speed in Miles per Hour
1913	Prevost (France)	Deperdussin monoplane, 100 h.p. Gnome motor . . .	44·7
1914	Pixton (Britain) . .	Sopwith float biplane, 100 h.p. Gnome motor . . .	55·3
1920	Bologna (Italy) . .	Savoia biplane flying boat, Ansaldo 450 h.p. motor . .	102·3
1921	De Briganti (Italy)	Macchi biplane flying boat, Fiat 300 h.p. motor . . .	117·4
1922	Blard (Britain) . .	Biplane flying boat, Napier-Lion 450 h.p. motor . . .	146·5
1923	Rittenhouse (America)	Curtis biplane, Curtis 465 h.p. motor	177·48
1925	Doolittle (America)	Curtis racer	232·57
1926	Bernardi (Italy) . .	Macchi, Fiat	246·49
1927	Webster (Britain)	Supermarine, Napier-Lion motor	281·669 ¹

¹ Major Segrave's world record for high speed motor travel in Florida, March, 1927, was 203·841 miles per hour, and in 1928 Captain Campbell's great record was 206·9 miles per hour.

A good idea of the speed of these latest Schneider Cup sea-planes may be obtained by realizing that a pilot could fly from London to Brighton in approximately 12 minutes, London to Paris in under the hour, and Webster, if his machine had been capable of sustained flight, could have flown from Paris to New York in 12 hours.

After the race the British pilots were warmly congratulated by the Prince of Piedmont ; General Balbo, the Under-Secretary of State for Air, who said it was " a most magnificent and stirring victory " ; and that fine old naval air pioneer, who flew over London upside down, now L'Ammiraglio di Division Commandante Militare Marittimo Della Piazza di Venezia II Duca Denti di Pirajno, gave the warmest congratulations to our airman. All pioneer airmen were delighted to see Admiral Denti occupying such an important position. His valuable pioneer naval air work is well known to many airmen in this country, and we all hope to see him occupy still higher positions in the Italian Navy. He gave, with his very charming Duchesa, a magnificent ball at the Grand Hotel for the British airmen and naval officers in our ships at Venice. We were given true, warm-hearted Italian hospitality, and nobody could have looked after their guests better than Admiral and the Duchesa Denti. Another Italian airman and poet, Signor Gabriele d'Annunzio, whom we all admire so much not only as an intrepid airman during the War but as a great Italian, sent our successful pilots good greeting and a memento of their fine achievement. On Wednesday, 28th October, the Italian Aero Club handed over the Schneider trophy to the victorious British team at an official luncheon. The actual trophy, which had been on view under guard in St. Mark's Square, could not be presented as it was too heavy, but the ceremony was carried out symbolically.

Prince Scalea, President of the Italian Aero Club, voiced the admiration for the great feat of the English pilots. He said—

The Venetian sky has seen many noble sights and valorous deeds in the past, and it is indeed fitting that in this same Venetian sky

English pilots should have won a victory which stirred the imagination of the whole world.

In the past and in the present the spirit of emulation has inspired airmen to ever greater achievements, and in the future the same spirit will drive them forward to ever new conquests. We hope that we shall again win this trophy, but in the meanwhile no words of praise can be too high for the skill, bravery, and daring of the British victors.

Most of us at Venice were very enthusiastic over the success of our airmen. We were all glad to read the telegram Sir Samuel Hoare, Secretary of State for Air, sent to Air Vice-Marshal Scarlett, commanding the R.A.F. Schneider trophy team at the Lido—

Delighted to learn successful issue of to-day's contest with our Italian friends whose skill and sportsmanship have been so abundantly shown in previous races.

Please convey to Flight-Lieutenant Webster and all concerned my heartiest congratulations on magnificent victory of "Supermarine" and "Napier-Lion" engine, which is one more proof of unsurpassed excellence of British personnel and material.

Had any of the present Sea Lords of the Admiralty stood beside me on the balcony of the Excelsior Hotel and witnessed Webster put up such a fine flight and seen the other British pilots doing so well, I am confident they would have joined all of us in the hearty cheer we gave Webster when he came over to the hotel after being declared the winner of the race, and it may be that they would have joined me in a laugh at the Whitehall Noahs, who so lamentably lacked vision in the early days of air development.

The designer of the supermarine Napier machine is Mr. R. J. Mitchell, who has been associated with our efforts to win the Schneider Cup for many years and gave valuable help in our 1922 victory at Naples. He must have been proud to see his machine, the fastest in the world, achieve such success in Webster's able hands, and all those interested in air work will, I know, give him hearty congratulations. I am informed that the "Lion" racing engine, which drove the winning seaplane

and the second, was manufactured by the British firm of Messrs. D. Napier & Son, Ltd., of Acton Vale, London, W., who have been constructing aeroplane engines since 1917. The special racing type is a development of the normal 450 h.p. "Lion" used in R.A.F. machines and by Imperial Airways.

The success of this engine, briefly stated, is due to the reduction of its frontal area, enabling it to be installed in a stream-lined fuselage offering the least possible resistance when going at high speed. To obtain this the cylinders are sunk into the crank-case, and in this respect differs from the Standard Lion engine. The magnetos and carburettors are tucked neatly away to prevent any excrescences. The weight is about 850 lb. for 875 h.p. The compression ratio is about ten to one. Six to one is a high compression ratio for a motor car.

I understand Messrs. Tait and Wilkinson deserve great congratulations for the design of this successful engine.

One wonders what the Noaahs think about Webster's fine flight of nearly 300 miles an hour!

We can imagine them saying: "What is the use of this poor fool risking his neck? That man Schneider ought to know better than to encourage these flying idiots."

I will enlighten the Noaahs.

The Schneider Cup race is recognized throughout the world as the highest and severest test aircraft constructors and aero engine builders have to face. The construction of a suitable machine to take part in the contest tests the workmanship of the employees who carry out the design in the building shops, both with regard to the machine and engine.

By producing a seaplane that wins a Schneider Cup race, the firms connected with the construction are likely to gain enormously in prestige and receive orders for more machines, engines, and air material. In the execution of these orders a large number of British workmen are employed. Firms can only win this race—

By carrying out a considerable amount of independent research work.

By assimilating the research work that air science of the day places at the disposal of aircraft constructors.

By giving every incentive to designers to create and not follow in the line of others.

By encouraging their skilled mechanics to take the utmost pains in their work, not only in regard to construction, but care and maintenance after construction.

Lastly, pilots must study every phase of flying, and keep themselves physically fit should they desire to achieve success. Webster is to be warmly congratulated in winning the blue riband of the air, and he can consider his feat of great value. Many lessons will be learnt that will still further advance air development, and I feel certain the thousands and thousands of our good Italian friends who witnessed his success will give all air effort their sympathy and encouragement, as they did so sportingly on the Lido this year.

After Webster won the cup, the Mayor of Walsall very thoughtfully sent a wire of congratulation to the pilot's mother. On receiving it Mrs. Webster is reported to have said—

I am proud of my boy and I am very glad that he is safe. It has been a very anxious time and I wish my husband were alive to-day to share in my joy.

Brave words from a brave mother—I can well imagine her great anxiety.¹

Next to Webster and Mitchell, Tait and Wilkinson, the Supermarine Co. and Napier Co., represented by Commander Bird, Sir Harry Brittain and Mr. Vane, should receive our warmest congratulations on their success.

I saw Sir Harry Brittain and Mr. Vane looking most anxious at Venice, and we were all pleased when they added another great achievement to their firm's distinguished record.

Mr. Vane does not seem to have much use for "Neon," and elementary prudence would seem to suggest that people who make a practice of running down air effort should be sure of

¹ See page 367.

the facts they bring forward, for I notice Mr. Vane, writing to *The Aeroplane* in regard to misstatement of facts in *The Great Delusion*, says—

On page 194 there is a specific reference to the Napier Company. In setting out the number of people required to build aeroplanes and aero-engines, "Neon" quotes from the "Hearings" before the Morrow Commission in America the statement that the Napier Company require 1,700 men to produce 15 aero-engines in one month. But the author does not state the date of this, nor that in addition to aero-engines, the Napier Company, up to 1924, were building motor-cars as well.

If he had troubled to obtain real facts, as showing the advance that has been made in aero-engine construction in the last few years, he would have found that the Napier Company employed in 1925-26 1,600 men and produced 50 complete engines in one month, in addition to which large numbers of spares were manufactured, equivalent to a further 15 engines per month. Therefore the Napier Company could produce from their factory at Acton, with 1,600 men, 65 "Napier-Lion" engines per month, when they were required.

In this year's Schneider Cup race, if turns were eliminated, our winning machine must have touched about 285 to 290 miles per hour, and the reader will naturally ask can this speed be beaten.

Of course it can. Even with Webster's present machine, if certain modifications that I have heard suggested are made, I believe five miles a minute can be exceeded, and I have no doubt, with the good nursing Air Vice-Marshal Sir John Higgins and our old R.N.A.S. pilot—Air Commodore Longmore—give the machines they order for the Royal Air Force, further successes lie ahead of us.

On their return to England the members of the team who won the Schneider trophy this year were entertained to luncheon at the Savoy Hotel, London, on 4th October by the Air Council.

Sir Samuel Hoare, the Air Minister, who presided, proposed the toast of "The Winning Team," and, turning to Flight-Lieutenant S. N. Webster, said—

I am proud to be the mouthpiece of the nation in offering you and your brother officers these congratulations. I am even prouder to be the mouthpiece of His Majesty the King in informing you that I am instructed to convey to you by word of mouth His Majesty's congratulations already sent to you by telegram, and to say that, as a mark of his appreciation of your achievement, the King has approved a bar to the Air Force Cross that you already hold.

You have already a fine record in the Service. In work and in sport you have made your mark. You have captained the Air Force football eleven ; you have already been decorated for conspicuous flying services. May your career be long and distinguished, and may it be an example to the young men of the country, who are glad to see a young man succeed and who believe that he has well deserved his success !

After paying a fine tribute to all who had helped to make the British success possible, Sir Samuel said—

What better evidence could we have of the generous sportsmanship of our Italian rivals than that, at the end of the contest, the feelings of friendship and comradeship between the two countries, and particularly between the Air Forces of the two countries are more cordial even than they were at the beginning.

To Signor Mussolini and General Balbo in particular I offer my most grateful thanks—to Signor Mussolini, the statesman who, with an eagle eye, long ago saw the future of the air, and to General Balbo, his brilliant lieutenant, who has set other Ministers an example difficult to follow, for he has added to the laurels of the politician the wings of the pilot. We are proud to have met such sporting comrades. We are fortunate to have beaten such brilliant pilots and such excellent machines.

Does not the race show in a conclusive manner the great progress that has been made in the air during a very short space of time ? A few years ago a speed of 45 miles an hour was sufficient to win the cup. This year the two winning machines reached more than six times that speed. Such an achievement as this is a crushing answer to the critics who, putting their heads in the sand, refuse to believe that there is any progress in the air.

Would not many have said that the human frame could not stand the strain—that the " Napier-Lion " engines could not hold out, that the supermarine machines would break into pieces ? Yet here to-day are the winning team.

Our team were fortunate in having the wise guidance of

Air Vice-Marshal Scarlett, who has been so long connected with air development. There are a hundred and one details to arrange in a race of this nature, and having a senior officer to settle matters makes everything work with much greater smoothness than otherwise it might. The Air Ministry could not have selected a better man to run this team than Scarlett, who is an old R.N.A.S. man of great experience. At the Air Ministry official luncheon to the winning team, Scarlett, who commanded it, said—

I would particularly like to congratulate Squadron-Leader Slatter. Although he flew the machines as well as anyone else, he was not selected to fly because I required him for the ground organization. He is to be condoled with, because he is an organizer of a high description.

Our cornering was something which surprised our opponents. Had we been flying machines of the same speed as our opponents, the effect of that cornering would have won us the race.

Webster proved himself to be a great pilot, so did Worsley and Kinkead. Kinkead remained in the race until, as we afterwards discovered when we inspected his engine, about another few revolutions would have been the end, so I congratulate him on putting up an extraordinarily good show.

Flight-Lieutenant Webster, who was received with prolonged cheers, said—

This was not an individual victory. I happened to be the pilot who was given the fastest machine in the race, and I did no more than anyone else could have done. I cannot speak too highly of our mechanics and of the Italian pilots, who are the finest sportsmen one could hope to meet.

These high Schneider Cup speeds, with the transatlantic flights, are beginning to bring home to thinkers what the future has in store for us, for I notice Sir Alfred Yarrow, the great shipbuilder, who resigned active work in October,¹ said—

I feel very strongly about this flying business. Get it into your head that in twenty years' time there will be a regular air time-table across the Atlantic. People who are in a hurry will go by aeroplanes. This will be the death knell of the fast Atlantic liner.

¹ *Morning Post*, 6th October, 1927.

The Noaahs will be furious with Sir Alfred for giving such a candid opinion.

To-day this country is entering upon the outside fringe of the air era.

We have before us times of great adventure and experiment. The air demands of our youth great daring, optimism, and faith.

The Schneider Cup pilots, who were so successful this year on the Lido, are in the forefront of pioneers of this great air development.

When fully developed, the air will alter very much our present mode of living, means of transport, communication with distant lands, etc.

Some people say we are a decadent nation, but this is not true as long as we have men and women who will put up fine records like Segrave and Campbell, with their racing motor-cars; Captain Broad, with his light aeroplane speed record; Webster, with his Schneider Cup; success women like Mrs. Elliott Lynn, who made a fine flight in October in ascending 19,000 ft. in an Avro-Avian machine—this is a world's record for light planes; Hinkler, in flying to Australia in 15½ days and securing four records; and Barry, winning the world's sculling championship on Boxing Day. Also Captain Bentley, who has just completed a 7,000 mile single-handed flight from Hendon to Cape Town; and Lady Bailey, in her gallant attempt to make a lone flight to the Cape in a Moth machine.

And then we have the great builders of the King type locomotive that would, no doubt, achieve many records when put to the test.

The winning of the Schneider Cup gives most Britishers much satisfaction. It is a triumph for British airmanship, our air industry, and aeronautical scientists. The Royal Air Force officers were picked men and the machines were the best of their kind.

Webster's achievement was 35 m.p.h. above the previous record, which is a great advance. These air feats yield lessons that tend to make flying easier and safer, and Sir Samuel Hoare

and the Air Council were wise in their sporting decision to encourage the race last year.

But I have to add one word of caution to our progressive people like Commander Bird, the very able managing director of the Supermarine Co., my good colleague, Sir Harry Brittain, and Mr. Vane, if they go on building machines with engines that will surpass the performance of the Supermarine Napier machine that won the Schneider Cup on the Lido last year. They will incur the very severe displeasure of the "Neons" and the "Noahs," who see no good in air development.

Does the reader imagine for one minute that these progressive air constructors and engine builders will stop? Never! Bird, Fairey, Roe, Vane, Handley Page, Sopwith, Short, Saunders, White, White-Smith, Blackburn, Acland, and many other aircraft constructors will seek fresh laurels, fresh difficulties to conquer, and defeat them in the splendid manner they have so often done in the past. These are not the type of men to run away from air development, but will, I am confident, do their utmost to advance aircraft construction in every possible way for the good of mankind and the civilization of the world.

Can any person imagine the progressive and very forceful Sir Harry Brittain, M.P.,¹ sitting still to please "Neon" or any Whitehall "Noah"?

At the meeting held by the International Aeronautical Federation on the 5th January, 1928, in Paris, it was decided not to hold a race for the Schneider trophy this year. The proposal of the Royal Aero Club of Great Britain that the race should take place every two years instead of annually was agreed to, and the next race will be held in England in 1929.

M. Jacques Schneider, the donor of the trophy, came specially from Monte Carlo to attend the conference, and warmly congratulated the British delegates, Lord Thomson, Colonel O'Gorman, and Commander Perrin, on Britain's magnificent victory last year.

¹ Member of Parliament for Acton.

CHAPTER XV

CONCLUSION

The world will indeed be supine if it does not realize that a new possibility has come to it and that the great universal highway overhead is soon to be opened.¹

THE best criticism of "Neon's" book is contained in the book itself, and that is the quotation from Shakespeare,² which runs—

When a man's knowledge is not in order, the more of it he has the greater will be his confusion.

"Neon" has made a great study of United States air matters, but has omitted to inform us that in a Report³ of the Select Committee of Inquiry into operations of the United States Air services, the following occurs—

A careful reading of the evidence taken before our Committee convinces us that (outside the Air Services themselves) there is not now in the army and navy a proper appreciation of the importance of air power as a combatant arm.

Also "Neon" does not acquaint us with some of the difficulties our very gallant comrades in the United States air service have had to contend with. No mention is made of their military "Noahs," for in giving evidence before the Select Committee, Senator Bingham⁴ related his embarrassment when invited to look into a plane—

Although an aviation officer, I was obliged to wear spurs. After a while they reversed that order, and aviation officers were not required to wear spurs, but after I came back from abroad I found that they had gone on the old order again and aviation officers wearing boots were once more required to wear spurs.

¹ Prophecy by Samuel Pierpont Langley, the great American scientist, who was the true father and inventor of human flight.

² Opposite page 123.

³ 68th Congress Report of Representatives, No. 1653, page 17.

⁴ "House of Representatives Report Inquiry into Operations of United States Air Services," Report No. 1653, 1925.

The United States has not adopted a separate air service, like this country and Italy have so wisely done, with so much advantage to air development. Italy has created the Regia Aeronautica, and is the first of the great Continental powers to adopt the principle of a separate air force on the lines of our Royal Air Force, which is entirely outside army and navy control. The Italians are to be warmly congratulated upon this action. It is quite impossible for the air to develop when tied to the older services, and Signor Mussolini has wisely recognized this fact. All nations have their "Neons" and their Noahs; they have existed throughout the ages, for has not Admiral Mark Kerr informed us that the Admiralty minuted the first proposal for an iron ship with this historic sentence—

This idea is ridiculous, for everyone knows that iron won't float.

Seamen were also afforded some amusement when Dr. Lardner's demonstration that no steamship could possibly cross the Atlantic Ocean was published after a ship using steam as her only motive power had successfully accomplished the voyage.

Again, naval historians inform us that our steam navy was born just one hundred years ago, when the Duke of Clarence, then Lord High Admiral, signed the commissions for the first three lieutenants to command the steam vessels *Lightning*, *Meteor* and *Echo*.

It was just before the commissioning of the *Lightning* that the carpenters had made the blunder of stating that they considered it derogatory to them as warrant officers to have charge of the engine men and their stores of oil and coal.

In their outlook they were no wiser than "My Lords" who in 1830 declared that they felt it their bounden duty upon national and professional grounds to discourage to the utmost of their ability the employment of steam vessels.¹

The prejudice shown by the Noahs of that period was indeed

¹ Letter from Engineer-Captain E. C. Smith, R.N., *The Times*, 6th December, 1927.

great against the new invention. Naval historians¹ also inform us that—

For the next generation we still built magnificent 90-gun line of battleships and large frigates, whose sole means of movement was their sail power, and which under most circumstances were at the mercy of the steamer. Nor was it until the eighties of last century that we thought it safe to build men-of-war without sail power. Further, it was not until the beginning of this twentieth century that the last sea-going man-of-war with sail power was put out of commission, and that canvas finally disappeared from the Navy nearly a century after the first appearance of steam.

In considering air development and transatlantic flights, we must remember the pioneer steamship *Savannah* of 350 tons that first successfully crossed the Atlantic, and compare her with the *Leviathan* and *Majestic* of these days.

There are many magnificent liners now crossing the Atlantic of great tonnage, great stateliness and stability, all evolved from the first effort.

It is difficult to imagine finer vessels; they are nearing the zenith of ship construction, and not a great deal more can be accomplished.

We have often heard the tale that Charles Dickens crossed the Atlantic in the old *Britannia*,² but declined to take the return trip as he believed the seven hundred tons of coal consumed during the outgoing journey lightened her beyond safety limits!

In the view of Admiral Sir W. H. Henderson, aviation cannot pay, and to use his own phrase: "It is essential in the public interest that the truth about aviation should be known."

May I give the reader an extract from a speech made in New York on the occasion of a banquet given in honour of Sir Philip Sassoon, Under-Secretary of State for Air, by the Aeronautical Chamber of Commerce of America, on 3rd November, 1927.

¹ Admiral Sir Herbert King-Hall.

² *Britannia's* first successful voyage across the Atlantic took fifteen days in 1840.

The chairman, Mr. Grover Loening, stated in the course of his remarks—

Many Americans believed that the real importance of 1927 from the aviation standpoint was that it was the first year in which American civil aviation has made a profit in its various phases. There were no Government subsidies in America. The biggest thing in American commercial aviation was the vast growth of private ownership and the tremendous number of fixed-base air service operators who were making real money. The air mail contract routes were making a real profit on their own resources.

Also in the columns of the *Morning Post*,¹ Admiral Sir W. H. Henderson has been adding to the gaiety of airmen by posing as an expert on air matters, for I notice in one of his letters he says—

Our airships have never carried a single passenger or a single ton of goods, and it is doubtful if they ever will.

Well, reader, I have often been a passenger in our naval airships. When we brought the first *Parseval* to London from Farnborough to look into my office window in the Admiralty, in 1914, I was a passenger. When I flew in the *Astra Torres*, with the late Commander Neville Usborne, I was always the passenger and not one of the crew.

It is easy for anyone to say our airships have never carried a single ton of goods because up to date we have never built a commercial airship in this country. Whether Admiral Henderson is a good prophet or not I will leave my reader to judge by the following, which I relate in strict confidence.

Over twenty-five years ago I dived Admiral Henderson in one of our first Holland submarine boats at Barrow-in-Furness, and put the boat through her various tricks on the surface and under water in the Cavendish and Devonshire docks. When we came to the surface and landed, Admiral Henderson turned round to me and said :

I am very much interested in your submarine and as I have

¹ *Morning Post*, 16th May, 1927.

inspected the Holland boat in America I want to inform you in my opinion they are perfectly useless !

My reply was—

But surely, Sir, submarine boats are in their infancy and will improve !

I made a careful note of the Admiral's remark at the time. After reading this opinion of a weapon that nearly brought this great nation to her knees, as can be seen by the table¹ given in footnote, no airman need be perturbed at what Admiral Henderson² writes or thinks about air matters, and naturally at his age the gallant old admiral cannot have any very great first-hand knowledge of the air.

In a most entertaining book that I have had recently much pleasure in reading,³ a very distinguished author, Major Christie, recalls to our mind some passages in the diaries of Thomas Creevey. One is headed "Creevey on Railway Travelling," and records his experience of this new form of locomotion as follows—

I had the satisfaction (November, 1829), for I can't call it pleasure, of taking a trip of five miles in it, which we did in just a quarter of

¹ TONNAGE OF BRITISH MERCHANT SHIPS LOST BY ENEMY ACTION
DURING THE WAR

	By T.B.'s, Cruisers, etc.	By Sub- marines	By Mines	By Aircraft	Total
Merchant ships .	442,702	6,635,059	673,417	7,912	7,759,090
Fishing vessels .	5,637	57,583	8,545	Nil	71,765
Total .	448,339	6,692,642	681,962	7,912	7,830,855

Table from *Hansard*, 18th July, 1927, column 24.

² Admiral Sir W. H. Henderson was one of the best Admiral Superintendents of Dockyards the Navy ever had. Devonport under his command was never more efficient. At that time he was looked upon as a great authority on dockyard administration and other naval matters by more than one nation.

³ *The Transition from Aristocracy*, by Major O. Christie, M.A., pages 206, 208, and 211.

an hour—that is 20 miles an hour. As accuracy upon this subject was my great object, I held my watch in my hand at starting and all the time; and as it has a second hand, I knew I could not be deceived; and so it turned out there was not the difference of a second between the coachee or conductor and myself. But observe during these five miles, the machine was occasionally made to put itself out or go it: and then we went at the rate of 23 miles an hour, and just with the same ease as to motion or absence of friction as the other reduced pace. But the quickest motion is to me frightful: it is real flying, and it is impossible to divest yourself of the notion of instant death to all upon the least accident happening. It gave me a headache that has not left me. Sefton is convinced that some damnable thing must come of it; but he and I seem more struck with such apprehension than others.

Major Christie gives us two other extracts, one from an article in the *Quarterly Review* of 1825, which was contemptuous of the new invention—

As to those persons who speculate on making railways general throughout the United Kingdom and superseding all the canals, all the wagons, mail and stage coaches, post chaises, and, in short, every other mode of conveyance by land and water, we deem them and their visionary schemes unworthy of notice.

Major Christie's other interesting reminder is that *Punch* has a picture, 1850, Vol. XIX, page 164, of a vinous old gentleman expressing his opinion—

Railroads, sir? I hate railroads and I shall be very glad when they are done away with and we have got the coaches again.

But this does not beat what a ponderous Sea Lord of very limited brain capacity said to me: "I would not touch your landship with a barge pole." Yet from the first caterpillar landship experiments by the naval airmen, the "tank" was evolved—a weapon unsurpassed in modern warfare. The naval airman's first caterpillar landship is the direct forerunner of the 35 m.p.h. tank that has been so successful. It is, indeed, most unfortunate that the Admiralty are so conservative that they seldom look at new ideas with favour. In Whitehall the curse that needs combating is extreme Noahism. Many men

in snug billets do not move with the times. They are not up to date. Some of our departments of State are too slow-going. They want a Minister of Defence to question, shake them up, make great economies by scrapping everything that is obsolete, and bring forward the young men with new ideas in exactly the same way as that great statesman, Signor Mussolini, has done so successfully in Italy.

These elderly men keep to the policy of Noah. As it was in the beginning will do for the present and will do for all times. This policy is still trying to check air advancement.

Some airmen partly broke up Noahism when it threatened to smother the air effort. It is up to all young, live-thinking men and women to slash out at this fossilism.

The times have changed.

We should thank our good God for it. We should be doubly grateful that we have entered the mechanical age with its fine steamships, railways, motor-cars and aircraft, and all the wonderful benefits that by their development have accrued and will accrue to mankind.

In former days the Navy has always been our first consideration, because it protected the heart of our Empire from invasion or attack of any description. It kept the freedom of the seas and allowed our food ships, raw material, and ships carrying our manufactured goods to ply from port to port with perfect freedom. It allowed us to transport troops, relieve garrisons abroad, and protect our nationals in all parts of the world.

But with the development of the air, the Navy cannot now protect the heart of the Empire.

The good doctor at Hertford who had the side of his house blown out by the bomb of a Zeppelin in the early days of the War received no protection from the Navy or the Army. He at first received no protection from the air, because the air was starved before the War. When money became available during the War period, and the airmen and air industry were allowed to develop the machines they had been so long advocating, the airmen broke up the Zeppelin menace, as these pages show,

and prevented the other side of Dr. Burnett Smith's¹ house from being blown out. Consequently a navy and army will not suffice for our protection; we must have aircraft in addition.

I can never understand certain Sea Lords' attitude towards air development. They approved the building of the *Mayfly* and then "crabbed" the experiment during the construction of this rigid airship, as letters in my possession from the Controller of the Navy show.

Even in those days they regarded the men who were enterprising enough to take up the air as a lot of villains. Yet their villany only existed in doing what the Government of the day had ordered the Navy to do, that was to develop airships. Naval funds paid us for carrying out this duty. Why airship work should have been "sniped" at from the very first is not easy to elucidate. Everything was so different when we introduced submarines into the Royal Navy. From the very early experiments with the Holland boats the Admiralty gave us fine crews, specially picked men from the Channel Fleet, the best material, good pay, good promotion, and the best of everything.

I do not recollect the Admiralty refusing us anything we ever requested. Only one thing I ever asked to have altered, and that was the drafting authorities would insist on sending big men to the submarines. I found they consumed too much oxygen and had difficulty in getting up and down the small hatches in the "Holland" and "A" class submarines, so I asked for small, rat-faced men, who were more adaptable and not so susceptible to the carbon monoxide and carbon dioxide gases that were a feature of the early submarines. Admiral Fisher was splendid in the good support he always gave the submarine pioneers, and it is quite correct to say that the Admiralty encouraged us submarine men all that was possible

¹ The late Dr. Burnett Smith, a very much esteemed practitioner in Hertford, had one side of his home, North House, blown out by a Zeppelin bomb.

in those early days to overtake the French, who had a long start in developing underwater vessels.

But in doing so they quite forgot to study what the submarine could do to this country in the hands of an audacious enemy. With the greatest respect, I venture to criticize some of the Sea Lords in this way. They will insist on looking at so many things from the small point of view, that is, through the wrong end of the telescope. When they get to the Admiralty they forget which end they used afloat. With the submarines they were warned that these craft would be a great weapon in naval warfare many years before 1914. But did they heed the warning of their own brother officers?—not a bit of it. They treated a submarine menace to this country as the wanderings of well-meaning submarine enthusiasts, and not to be treated really seriously.

Before the War many Admirals afloat had not the vaguest idea of submarine warfare. Not their fault, as the Admiralty had given them no opportunity of studying these underwater vessels. Few had ever dived in a submarine, and many had never even seen one at close quarters. I warned the Admiralty, in my submarine book published in 1907, that the Germans would use the Belgian harbours¹ for submarines, and of the danger of merchant vessels² being sunk by submarines, in as diplomatic language as I could use, and not offend at that time the susceptibilities of any nation. But the Sea Lords in their great wisdom paid no heed to their submarine experts, and when war broke out the submarine had not been studied in any detail by those outside the submarine service. When the battleship *Formidable* was sunk by a submarine, and the cruisers *Aboukir*, *Cressy*, and *Hogue*³ were sunk in one attack by the very skilful handling of one, or may be two, German submarines operating in the North Sea, the Sea Lords then began to see that their submarine experts had been right, and it would have

¹ *The Evolution of the Submarine Boat, Mine and Torpedo*, published in 1907, pages 174–5.

² Page 352. ³ See page 73.

been wiser if they had taken the big view and studied what the submarine could do from every possible angle, particularly the best means of combating this form of warfare.

Some of the Sea Lords could see nothing of value in the airmen's armoured car. They took the little view. Whereas the airmen thought there might be something in their armoured car, if they fitted caterpillar tracks in place of wheels, and took the big view that caterpillar landships were worth developing. Sir William Tritton showed them that they were right. He and Major Wilson took the big view, and developed the naval airmen's caterpillar landship into the successful "tank."

Again, with aircraft, some of the Sea Lords failed to take the big view. They thought they could stop air development by squashing the Royal Naval Air Service. This was the little view. Certain airmen took the big view when the Admiralty showed definite signs of blocking air development, and, with Lord Montagu's magnificent and ever so much appreciated assistance, went full out for a separate Air Ministry outside all Admiralty and War Office control. The naval airmen, for their own advancement, would have been wiser to have followed the Sea Lords' narrow view. But I am very happy to be able to record that several of them swept aside all personal considerations and took the big view in their endeavour to do all they could for air development.

In his very interesting book¹ Admiral Mark Kerr writes the following—

I can well imagine what Sueter² was up against at the Admiralty in his efforts to forward the Royal Naval Air Service when I recall many observations made by Lords of the Admiralty and other great people of the conservative class on the subject of the future of aviation. I remember one very gallant admiral (who has now, I am sure, taken his wings for he has passed over to the other side) saying that two aeroplanes would suffice for the whole needs of the Navy in the next war. But he never explained what work these two solitary planes were going to perform! Another Lord of the Admiralty

¹ *Land, Sea, and Air*, page 281.

² The Author.

observed that four lieutenants had been taken from the Navy for the Royal Naval Air Service and that was four too many, and if he had anything to do with it, the number should not be added to.

Yes, reader, I was up against it as Admiral Mark Kerr rightly observes, but to what extent I will not entirely disclose in these pages. Some of it is priceless, and I often imagine myself reading a few of the selected documents in my possession on the floor of the House of Commons.

The really funny methods of some former Sea Lords to prick the naval airmen, who did not care two cents for their petty ways or stupid intrigues, crops up at this distant date, even inside the House of Commons. Recently a well-known Member of Parliament gave a large dinner in the Strangers' Room, and before we all separated a guest came up to me and said: "May I introduce myself to you, Admiral—I think you know my brother, Lanchester?"

"What, my old friend the learned aerodynamical Lanchester¹?"

"Yes, that is the one. My brother always spins a good yarn about you."

"Does he," I said, "may I hear it?"

"My brother says that you sent in rather a deep technical report on air matters. The Admiralty referred it to my brother for report, as nobody then at the Admiralty could deal with it, as it was rather too technical.

"He returned it, saying Sueter's deductions were quite correct and it was a good report. The Admiralty were not satisfied with this, and a secretary was sent to see Mr. Lanchester to inform him that their Lordships at the Admiralty desired to find fault with the report."

Mr. Lanchester replied: "No, I am not going to alter my opinion. Sueter is perfectly right. It is a good and carefully thought-out report." The secretary said: "But the Sea Lords want your remarks altered, Mr. Lanchester, as they wish to find fault with the report." Mr. Lanchester said: "I decline

¹ Author of *Aerodynamics*, *Aero-Kinetics*, *The Flying Machine*, etc.

to do so." The secretary : " But, Mr. Lanchester, you do not seem to know what a Sea Lord is ! "

" Oh ! " Mr. Lanchester replied, " I suppose it is one between a B-Lord and a D-Lord ! "

I am informed that two naval officers, one retired and one stationed at the Admiralty, inspired " Neon " to write the unwarranted attack on all air effort. Whether this is correct is not within my knowledge. I hope it is incorrect because, in my view, it is not really good cricket for an officer, or officers, in one branch of the services of the State to attack officers in another branch, particularly when they are doing creative work of a difficult and somewhat risky character, as experiments with our new large rigid airships undoubtedly will be.

The new First Sea Lord, Admiral Sir Charles Madden, will, I trust, turn a cold eye on such tactics. He will, I think, sympathize with airmen and what they have attempted to achieve, and the problems they have successfully solved in the last few years.

Sir Charles Madden is a torpedo officer with considerable scientific attainments ; he is a clear thinker, full of force, has had great experience in handling fleets, and knows more about fleet work than almost any living man. One thing I am certain of, and that is there will be no stupid piffing blocking tactics or intrigues against air efforts whilst he is First Sea Lord.

Sir Charles Madden will have learnt when afloat to appreciate the full value of the air to the Navy, and will, I feel convinced, take the long view and press for the development of all types of aircraft that are likely to be useful for naval needs, particularly the torpedo machine that was cold-shouldered for so long.

He will understand the value of the 5,000,000 cub. ft. hydrogen gas capacity airships, if these can be successfully moored to their masts and manipulated into their sheds without damage. Sir Charles Madden knows, from seeing the German Zeppelins working in the air over the North Sea in the Great War, that

this type of aircraft can, if successfully developed, be of great value to a fleet for scouting in fine weather, or working on the trade routes, and I am certain he will help, not hinder, the Air Minister in his big effort to unravel some of the great problems of the air that lie before him.

The long flight of Sir Alan Cobham to Australia and back was of particular value in showing how a machine could be used either as an aeroplane or seaplane, and how great sections of coast-line could be kept under aerial observation.

Also, Pulford showed this in his fine flight from Egypt to the Cape and back, when floats were fitted to his machines, and they flew successfully from Egypt to this country.

With an efficient equipment of flying machines a cruiser's usefulness can be greatly extended.

The new First Sea Lord will appreciate, no doubt, what the young school of airmen can do in this direction, and I feel certain will help them, not only in the interests of the Navy but of the whole Empire. If he will have the hostile hatchet to air effort buried at the Admiralty so much the better for the future relations between the two Services.

Popular opinion in this country demands perfect equality for the Navy, Army, and Air Services. It recognizes that all three Services are the forces of the Crown, and demurs at one Service trying to score off the other Service. This is not regarded as fair play, and it will have no tampering with the efficiency of the Air Service by the older Services.

For many hundreds of years the Navy has had, and rightly so, first place in popular favour. Now they must reckon with an equally efficient third service, and I think every right-thinking person should turn the cold shoulder on petty rivalries, and pay equal tribute to all who serve their King in the three fighting Services.

The younger men in the Navy and Army are not bewildered by air development like many of their seniors were. They will, I am convinced, welcome their air brother on terms of perfect equality. The older men may not be disposed to do so. But

that does not greatly matter, as they will soon pass on and, in my opinion, they are rather foolish to encourage, in the House of Commons and outside, these stupid intrigues against the Air Service that are now becoming, as Colonel Moore Brabazon¹ calls them, hardy annuals.

Naval administrators have suffered a narrowness of outlook in dealing with air development. Mistakes have been made in the past, but there is no reason for them to continue. Both the Navy and Army have real need of the assistance of the airmen in carrying out their duties in all parts of the world.

No officer has a better reputation as a sound thinker and great student of naval problems than Admiral Sir Cyprian Bridge. When writing in *The Times* a short time ago, he stated—

Let us acknowledge without further hesitation that what you call " the Development of Aircraft " has introduced into the conduct and operation of naval warfare a new factor beyond question the most important since cannon were first mounted afloat. Its importance far exceeds the introduction of the locomotive, torpedo, or of the submarine.

These are very wise words from Sir Cyprian Bridge, and worth the attention of all those who desire to see the fighting forces of the Crown efficient.

In addition to their independent mission in having to defend these islands from air attack, our airmen have to serve in all parts of the world. We read in the Press² that the Air Force units have been of some use recently in China.

When the Chinese troops detained on 17th August of last year³ the wings of a British aeroplane that had been obliged to make a forced descent on the Kiangwan Racecourse through oil trouble, resulting in a broken piston, the British Commander-in-Chief promptly cut the loop railway line. The

¹ The Member of Parliament for Chatham Division of Rochester, and one of the first and finest airmen to take his pilot certificate. He was the first Englishman to fly a biplane successfully.

² *Morning Post*, 19th December, 1927. ³ 1927.

Chinese general was nonplussed by this quick action, and offered to return the wings if the British Commander-in-Chief would give a written statement to the effect that they had fallen in Chinese territory by accident.

General Duncan must have been amused at this way of saving face adopted by the wily Chinese, and no doubt readily acquiesced. The aeroplane wings, we were told by wireless, were returned intact.

The *Morning Post* correspondent informs us in connection with this incident, in a communiqué dated 18th August from Shanghai, as follows—

In view of the detention yesterday by Chinese troops of parts of a British aeroplane, residents in the settlement strongly hope that the reported decision of the British authorities to withdraw the air squadron will be reconsidered. Daily flights over the Shanghai district since the squadron's arrival have had the greatest moral effect on the Chinese, who realize the enormous fighting value of aeroplanes, whereas 20,000 troops scattered over a wide area are not impressive.

If the decision to recall the squadron cannot be altered, it is hoped that the *Hermes*¹ and the *Argus*¹ will remain at Shanghai, and that the racecourse will be used as headquarters for flying machines.

Everybody enthusiastically commends General Duncan's action in cutting the railway. He has had the strongest support from leading Chinese merchants in the settlement.

The Commander-in-Chief is not likely to withdraw the British Air Force until he is quite satisfied that no further uncertainty in the situation in the Shanghai area exists.

Our nationals in Shanghai think our Air Force is of some value, whereas "Neon" and the Noahs see no use in the air. It may be that our good residents in Shanghai are in a better position to judge of the value of aircraft in Shanghai at this particular time than "Neon" or the Noahs.

There are some extremists connected with the air, as in other walks of life, who hold the opinion that armies and navies are

¹ Aircraft carriers.

obsolete, and that future wars will be decided in the air. There is no doubt that the air will play the most important part in future wars, and it is certain that in special cases decisions will best be obtained by air pressure; but with the view that navies and armies can be abolished altogether I disagree most profoundly, and those who encourage these ideas are, in my opinion, doing much harm to air development.

The Air Force can never entirely replace the Navy or the Army. But it can, in addition to its own vital independent mission, help both these Services to attain a greater efficiency, and there is no doubt economies can be effected by employing aircraft and airmen for certain work, as is shown by the many millions now saved in the administration of Iraq.

Until all nations agree to universal disarmament it is prudent for a great Empire like ours to provide an efficient Navy, Army, and Air Force, not only for ensuring our security, but to protect our nationals in all parts of the world and to maintain our sovereign rights should they be challenged at the conference table or otherwise.

Each nation, according to her geographical position and world responsibilities, must be the best judge of what forces she should maintain for her security.

Turning to the civil side, no thinking man or woman can now ignore air development. They may agree or disagree with it, but to block its progress is not possible.

What are the great air questions, outside defence measures, that the airmen seek to solve? Where is the man or woman who does not desire to see our great world-scattered Empire linked up by rapid means of transport, travel, postal services, emergency services in case of sickness or accident? Sea travel, road travel, train travel, and air travel are all now necessary to build up our Empire on as solid a foundation as Cheop's Pyramid. Where is the man or woman who is not vitally concerned in seeing all nations of the world linked up by a network of air routes to benefit civilization? By this means barriers between peoples of all countries can be broken down,

new bonds of friendship can be formed. It will enable all races to better understand one another, and appreciate the real conception of inter-relationship. A family of nations, knit together by commercial air interests, enabling the closest of intercourse, will do more for peace throughout the world than a thousand Locarno treaties.

The truth of the whole matter is that we must educate the youth of this country in the advantages to be gained by this nation in air development, particularly in regard to air communication and air travel. They are the best agents for combating the public imagination that there is still an element of undue risk in flying.

Risks occur in every form of transport, and it is only when statistics over a period of years can be carefully examined that the proportionate safety of the different methods of travel can be compared.

At present there are no exact flying statistics available. But what there are shows that in the last two years air travel is much safer than generally realized. This safety is year by year increasing, whereas that of road travel, due to the very large number of motor-bicycles, motor-cars, lorries, chars-à-bancs, etc., on the road, would appear to be decreasing.¹

We must also train the youth of the country in air power in exactly the same way the public has been taught the value of sea power.

There are many persons who can help in this matter, and all airmen owe a deep debt of gratitude to Sir Geoffrey Butler, M.P.,² for his good and successful efforts in persuading the Universities to take an interest in aviation. The authorities have been very helpful, and the interest in air matters has been generally stimulated at both Oxford and Cambridge.

Sir Philip Sassoon, Under-Secretary of State for Air, informed

¹ At the time of writing Henley Hospital is full of road accident cases, and there are no beds vacant for local needs, 24th August, 1927.

² Member of Parliament for Cambridge University.

us in the House of Commons recently,¹ that each squadron now consists of about fifty undergraduate members, and at Cambridge there is a considerable waiting list. Oxford is now running Cambridge close in their interest in flying.

That is a good line to work upon, and I hope all Universities, colleges, and large schools will follow Sir Geoffrey Butler's good example and encourage their undergraduates, students, and pupils to take an interest in the air movement.

In addition to Sir Geoffrey Butler's good work for the air at the universities, the establishment of private flying clubs is an excellent movement, and the Government is to be congratulated in backing up the Air Ministry in educating the young men and women of the country that there is nothing extraordinary or dangerous in normal flying. These clubs, in my opinion, should be assisted in every possible way, and it is to be hoped public men like Lord Lieutenants, High Sheriffs, Lord Mayors, Mayors and Chairmen of County and Urban District Councils will give a helping hand in forming clubs as opportunity offers.

I have refrained from dealing with "Neon's" extraordinary, overdone fanaticism against oil fuel, because it appears to be introduced as a "red herring" to hide the quarter in which the inspirers of "Neon" shelter.

Captain W. H. Sayer, in an able criticism of *The Great Delusion in Aeroplane*,² remarks—

Unfortunately it is likely to be taken more seriously by certain unintelligent or mischievous sections of the politically minded public and may do a considerable amount of harm.

If these pages can lessen some of this harm feared, and rightly so, by Captain Sayer, they will not have been written in vain.

It is because I believe in the future of the air with every fibre of my being that I have taken up the challenge of the *Morning Post* in my reply to "Neon," and I feel that the interests of the Empire are being ill-served by those who desire to block all air work.

¹ 1927. ² *Aeroplane*, 23rd March, 1927, page 298.

There is nothing new in pressing for more Empire development. It is a very old problem. We live now in different times, and old problems must be looked upon in a new way. In the past the steamship and railway have been the principal means of building up our Empire. We are now on the outside fringe of the air age, and should use this new means to assist in opening up and the further development of our lands. In this endeavour we should all pull together, avoid piffing criticism, and seek to bind with new links our kinsmen across the seas by this wonderful air development, and hand down to the distant ages the work of stalwart airmen who have blazed the trail, and also, like their ancestors in Elizabethan days, are prepared to conquer great difficulties in developing high-speed travel and rapid transport in the interests of humanity.

In conclusion, may I submit that I have taken my reader in, I fear, a blunt sailor's way through some phases of air development. I have pointed out a few matters within my knowledge with, I hope, fair criticism, and have drawn attention to facts connected with the air services in the Great War to make it quite clear to the unbiased reader that the airmen did contribute their share to gain "Victory" in exactly the same way as their brothers did in the Navy and the Army, and those who kept up the supply of munitions so wonderfully well.

I have endeavoured to meet the challenge of the *Morning Post* in the spirit of fair controversy, and give the answer to "Neon" that my very able, learned, and progressive colleague, Sir Henry Cautley, K.C., M.P., was in search of in the House of Commons.

The present air policy has been touched upon, and how the economical and more efficient administration of the fighting services can be improved by the introduction of a Ministry of Defence. Accidents have been dealt with. I have shown the value of long distance flying, how civil aviation can be developed and the need for a real bold Empire air policy.

May I ask my readers this simple question: Would they prefer to see all air work stopped, as the Noahs and

"Neons" desire, or foster this great air movement that is calling, calling, ever calling to the fine youth of our race to take a hand in, to use, to improve, and with it to link up the distant parts of the Empire, to bind nations closer together for mutual good understanding, and be a great benefit to those who come after us and to the whole civilization of the world?

Father Neptune has raised some sturdy sons, but even he is beginning to see, as he watches the transatlantic flights, that they are not the only pebbles on the beach. (Plate 60.)

What all airmen are entitled to ask from the "Noah's Ark School of Navalists," as Mr. Garvin so aptly describes them, is fair play and less carping, rasping, snarling, ignorant and jealous criticism, and that anonymous attacks on air efforts should cease.

If criticism is desired, let it be quite open and frankly given, be constructive, not destructive, made by men who can show their qualifications and who are not afraid to sign their own names to their criticisms.

As a final word, may I invite the thousands of our countrymen and women who were interested in Alcock's first transatlantic flight, in Scott's airship flight to America and back, Cobham's flight to Australia and back, Pulford's and Samson's flight to the Cape and back, Sir Samuel and Lady Maud Hoare's flight to India, the thousands who assembled at Croydon to welcome the lone flyer, Lindbergh, all the thousands who watched, waited, and were much interested in Chamberlin, Byrd's, and Brock's transatlantic flights, Miss Ruth Elder and Captain Halderman's very fine effort, those who were interested in that intrepid airman, Carr, in his three most gallant attempts at a non-stop flight to India, the thousands and thousands who have been interested in Webster's great feat in winning the Schneider Cup at Venice in 1927, and who have been most interested in Hinkler's great flight to Australia, Lady Bailey and Lady Heath's fine flights in Africa and this country, the tens of thousands who witness and delight in the

PLATE 60
NEPTUNE FEELS A DRAUGHT



Neptune :

Shiver my shiny scales !
These bird-men maketh a draught !
They have broken my trident
And stolen the barb,
And my Crown and Kingdom are threatened.
Unless I rouse myself
I am undone.

Boat ahoy ! Boat ahoy !
Good old Noahs !
Take Aphrodite and mermaids too.
For I intend to fly with Ruth
Around the seven seas,
And thus control my kingdom
With efficiency, speed and ease.

fine air pageants given at Hendon and other air pageants held in all countries, the thousands who now travel by our efficient Imperial Airways and the other great airways of the world, and the readers who have kindly honoured me by perusing these pages, to join me in a very hearty, long laugh, and then repeat it at the "Earthbound Noahs," for indeed—

I speak bare truth
As if to thee in private talk.¹

in calling them the "Moles of Men."

I am quite confident that the majority of my countrymen and women have little use for these "Moles of Men" who desire to prevent the development of everything that is new. As I have pointed out,² one hundred years ago the Noahs of that period did their utmost to prevent steam propulsion being introduced into the Royal Navy.

At a later date other Noahs have objected to the introduction of new inventions such as breech-loading guns, the Whitehead locomotive torpedo, the submarine, railways, motor-cars, caterpillar landships, and now the air is not in favour with these gentlemen of microscopic vision.

The Almighty has given us the great permanent highway of the air for our use. Its upkeep costs not a penny. Nearly thirty years ago Langley, the famous American scientist, said: "The world will indeed be supine if it does not realize that a new possibility has come to it, and that the great universal highway is soon to be open."

Langley pointed the way. Reader, the great air highway is now open. Who can doubt that the human race will make full use of God's great gift in the general advancement of civilization!

¹ Wordsworth, page viii.

² Page 392.

AUTHOR'S NOTE

BACK AIRMEN BEFORE NOAHS

THE author, in seeking information from the sources named, fears he has paid insufficient acknowledgment for the extracts taken. A good many quotations have been made from official dispatches, etc., as they are more interesting than if the writer had paraphrased them, or referred to the passages incidentally.

The Prime Minister, Mr. Stanley Baldwin, who, I imagine, is a good judge of books, recently informed us that the most interesting books in history had a bias.

My first book, dealing with the evolution of the submarine boat, mine, and torpedo, had a distinct bias, and I fear this book on air matters has still more of a bias. In dealing with Mr. Pollen's and "Neon's" views regarding air development, I have supported my case wherever possible with documentary evidence, and my reader must judge between us.

I am quite aware that I lay myself open to the criticism that I am casting a few bricks at certain former "Sea Lords" of the Admiralty who were antagonistic to "air development." My answer to that criticism is this: The Board of Admiralty has a perfect right to criticize the action of any officer holding any post inside or outside the Admiralty, and, if he displeases them, to dispense with his services. But they should not make use of his brains and then for years "crab" his best endeavours. This is distinctly unfair to any officer.

With regard to my work as Inspecting Captain of Airships and my administration of the Admiralty Air Department, as its first Director, extending over many years, I found myself in this somewhat awkward and surely rather unusual position.

On the one hand, several First Lords and many other of the civilian officials who were heads of branches at the Admiralty, with their chief assistants, thought that there was something

in air development, and went out of their way to encourage me and other naval airmen all they possibly could.

Nobody could have been more helpful in our air effort from 1909 onwards than the three First Lords of the Admiralty: Mr. Reginald McKenna, Mr. Winston Churchill, Mr. Arthur Balfour, and their secretaries. Also we received much encouragement and assistance in our difficult task from the very able Secretaries of the Admiralty, Sir Graham Greene and Sir Oswyn Murray and their staffs.

On the other hand, some of my brother officers who were "Sea Lords" were not helpful. Lord Jellicoe is the outstanding exception, as he showed during the short time he was Superintending Lord of the Naval Air Service that he was full out to help the naval airmen.

The records with the Committee of Imperial Defence and at the Admiralty show his wisdom and foresight in pressing for a forward air policy.

Certain other "Sea Lords" on more than one occasion blocked air development. Lord Curzon, in talking to Commander Groves and myself, said that Mr. Churchill, in giving evidence before the Air Board, stated that: "The Sea Lords gave no assistance to the creation of the Naval Air Service, but, on the contrary, hampered it in every possible way, chiefly financially."

I say definitely and deliberately I had not the support from certain Sea Lords that I had the right, first as Inspecting Captain of Airships and then as Director of the Admiralty Air Department, to expect, and none know it better than some of the permanent officials at the Admiralty.

I took the bricks hurled at me for many years in good part, and merely laughed. I refused to resign to please some of the Sea Lords, and stuck to my air work with the fine support of more than one First Lord, without bothering too much about hostile criticism of every person and everything connected with the air movement.

For nearly twenty years I have remained silent. If I lift the

veil a little in the interests of historic truth, to show the senseless blocking tactics pursued by certain Sea Lords of the Admiralty, to indicate what a man had to put up with in the early days of the air movement, and his very difficult and uphill work in endeavouring to solve some of the great air problems the pioneer is faced with, I am convinced few will blame me.

The unbroken bricks can remain for the present where deposited. Should I have the leisure at some future time to unearth these unbroken bricks, and unfold their full story, it will make interesting reading.

With all deference to my distinguished brother officers who differed from me over air matters, and who tried to block air development, I still hold strongly to the view that an independent air service and independent air arm, free from all Admiralty and War Office control, is indispensable to the national safety.

Public opinion backed up most nobly the efforts of Lord Montagu and certain naval airmen to obtain this separate air service, and so allow airmen to develop their own aircraft and ensure concentration of effort without duplication. This also prevented the older Services from stifling air progress.

The Air Force has been in existence now for ten years. It owes much to Sir Hugh Trenchard for his untiring efforts during this long period. He has been ably supported by successive Air Ministers, as Lord Cowdray, Lord Rothermere, Lord Weir, Captain F. Guest, Sir Samuel Hoare, and their very able staffs. All have worked extremely hard in making our Air Force, though small, the most efficient air service in the whole world.

In looking back before the creation of the separate Air Service, I do not exaggerate when I say that the vast majority of our countrymen and women were disappointed over Jutland. They were never more than slightly interested in the mass of literature that has been circulated between the pro-Jellicoeites and the pro-Beattyites, the perusal of which has left them quite cold and still rather sore.

Without entering into the intricate problems that arise in

dealing with the technicalities of the Jutland Battle, they desire to know in simple language how it came about that the Grand Fleet, possessing some considerable superiority over the German Fleet, allowed that fleet to sink many of our ships and then escape without suffering greater punishment. May I recall that at dawn on 1st June, 1916, some of our battleships engaged one or two Zeppelins. We are now informed by some very gallant German airship officers that their Zeppelins "L 11" and "L 24" wirelessly to the German Fleet reporting that they had located many of our ships and gave all the necessary information.

Scheer then knew the exact position and course of the main groups of the Grand Fleet, whereas Jellicoe and Beatty were ignorant of the position of the German Fleet.

No person should ever think of blaming Jellicoe or Beatty for this lack of suitable aircraft for determining the position of Scheer's Fleet and to follow his movements at dawn on 1st June, 1916. The responsibility for this omission rests solely with certain "Sea Lords" who refused to allow their naval airmen to develop rigid airships for work with the Fleet after the *Mayfly* (No. 1 Naval Rigid) was wrecked in 1911. "My Lords," in the great sageness of their minds, were graciously pleased to allow us to develop submarines in a systematic way, but not rigid airships. Before the war ended the Navy pressed for rigid airships. But it was then too late. The valuable years from 1911 to 1914 had been wasted.

I have refrained from quoting a single secret document that I have not had permission to use in my book. But I give one, recently published in America, here, as the reader will, I am certain be interested to gather any further information that can throw more light on why Jellicoe was unable to gather the full fruits of his Jutland victory. Captain Ernst A. Lehmann,¹ a skilled German airship officer, informs us that Rear-Admiral W. A. Moffett, Chief of the Bureau of Aeronautics, U.S. Navy, in a recent statement to a Congressional Committee,

¹ *The World To-day*, January number, 1928.

quoted part of a secret British report, dated 20th September, 1917, giving their views on the work of Zeppelins at Jutland. These are as follows¹—

From the results already given of instances, it will be seen how justified is the confidence felt by the German Navy in its airships when used in their proper sphere as the eyes of the Fleet. It is no small achievement for their Zeppelins to have saved the High Seas Fleet at the Battle of Jutland; to have saved their cruiser squadron on the Yarmouth raid, and to have been instrumental in sinking the "Nottingham" and "Falmouth." Had the positions been reversed in the Jutland battle, and had we rigids to enable us to locate and annihilate the German High Seas Fleet, can anyone deny the far-reaching effects it would have had in ending the war? There are many other striking, though perhaps less important, successes to the credit of Zeppelins at sea—even to the capture of the Norwegian barque "Royal."²

The value of Zeppelins to a fleet in naval warfare, as thus shown at Jutland, justifies "up to the hilt" the attitude taken by some naval airmen in pressing for the development of rigid airships for working with our fleet from the *Mayfly* days onwards, as the Committee of Imperial Defence papers can show.

Reader, the naval airmen desired to give our Fleet rigid airships for scouting purposes, as they knew their full value. Their efforts were turned down, and to their chagrin they have lived to learn that "Zeppelins" saved the German "High Seas Fleet" at the Battle of Jutland, when our Fleet from the air point of view was almost blind!

¹ *The World To-day*, January number, 1928, p. 193.

² Captain Lehmann informs us that in April, 1917, the L 23 sighted the Norwegian barque *Royal* carrying contraband. The Zeppelin dropped a bomb in front of her, came down on the water, sent a prize crew on board, and took the *Royal* into Cuxhaven as a prize of war.

The "Sea Lords" who were responsible for this lack of vision are scarcely to be congratulated for over-doing the worship of Nelson's blind eye. "Sight is might" is just as true for a fleet as a human.

In placing the Grand Fleet in the disadvantageous position of allowing our enemy to possess a superb sea scouting vessel over the North Sea, a type we did not possess ourselves, our country and the Empire was not well served.

Again, the value of rigid airships was well demonstrated in March, 1928, when the American airship *Los Angeles* completed a 4,000 mile voyage from Lakehurst, New Jersey, to France Field, in the Panama Canal zone, then to Guascanayaba Bay, Cuba, where she secured to the mooring mast of the naval tender *Patoka*, and then returned to Lakehurst.

During the cruise she covered 2,265 miles in 40 hours. This is the longest flight this airship has made since crossing the Atlantic from Germany in October, 1924. Then she accomplished her 5,000 mile flight in under 81 hours.

On returning to Lakehurst from Panama she met with heavy weather and it was some seven hours before she could be safely housed.

The handling party were at times in difficulty, as the squalls were severe. I suggest to the American airship men that they should develop caterpillar handling machines. During the War I caused a series of experiments to be made in using a caterpillar tractor to handle a coastal airship in fairly rough weather. These experiments were quite successful and showed caterpillars could be developed for this service.

Airships can never be handled successfully until a large number of mooring masts are available for them to run to, in the event of bad weather being experienced in any particular locality.

Sir Samuel Hoare, in his Memorandum on the Air Estimates for 1928, informs us—

At the Imperial Conference of 1926, H.M. Governments in Canada and South Africa each undertook to erect a mooring tower base to

enable demonstration flights to be carried out by the two new airships to their respective territories. Representatives of the airship, meteorological, and works staff of the Air Ministry were accordingly sent to assist the Governments of Canada and South Africa with regard to the selection of suitable sites. A site for the purpose has been acquired by the Canadian Government near Montreal, and a decision will shortly be made by the South African Government with regard to a site in South Africa.

At the request of H.M. Governments in Australia and New Zealand, the mission which visited South Africa proceeded to these Dominions and carried out similar investigations, with a view to future development. Opportunity was also taken of the journey to South Africa and Australia to inspect possible sites for intermediate bases in West and East Africa, Ceylon, and other Crown Colonies.

In Australia the Commonwealth Government has decided to acquire the land necessary for setting up the first airship base in that country in anticipation of future developments, and also to extend its meteorological services to meet the possible requirements of such operations in the future. The Government of New Zealand is making arrangements for a similar extension of its meteorological services.

The Dominions are to be most warmly congratulated in showing their interest in airship development in such a practical manner.

Passing from lighter than air aircraft to heavier than air machines, may I recall that in their dispatches both Jellicoe and Beatty informed us that the weather was suitable for seaplanes, as a machine from the Engadine was sent up in the early phases of the Jutland operations, and made an accurate report of the movements of some of the enemy's ships.

This showed torpedo machines could have been used. But the Fleet was not provided with any. The Sea Lords must accept responsibility that these torpedo machines were not available for use with the Grand Fleet on the evening of the Jutland Battle and the morning after. Our airmen pressed for their provision, as my pages disclose, but they were turned down.

I feel quite confident that the historian of the future will support me in condemning those Admiralty administrators from 1911 onwards who lacked vision in not developing rigid

airships of the Zeppelin type, in addition to reconnaissance and torpedo machines to operate from suitable aircraft carriers for fleet work.

Their failure to appreciate the full value of aircraft in this reconnaissance and torpedo work, in my judgment, let our Grand Fleet down very badly and prevented Jellicoe and Beatty from obtaining the Nelsonian victory that all our people so much desired. Few can doubt that such a victory would have brought the War to a speedier termination.

For all time "Jutland" will be the outstanding warning to this country and be the classic example to the whole British Empire to back Airmen before NoaHS.

I consider certain Sea Lords were equally unwise in trying to smother the Naval Air Service in war-time after Mr. Churchill left the Admiralty. It appeared to me that the minds of these Sea Lords, no doubt second to none as great masters of sea warfare in all its branches, seemed to move in a backward direction, and not forward, in all matters connected with the air.

My readers are the best judges of who was right, certain Sea Lords in hindering air development, or I to press for the development of all types of aircraft, as shown in this book. We are often told war has tests and standards of its own. I submit that the Royal Naval Air Service came through the War on a perfect equality with any other branch of His Majesty's forces.

I was vastly proud of the great work of the naval airmen who served under me for so many years. We have all been justified of our faith in the air, and those who received so many kicks I would remind them that a short time ago my astute colleague on the First War Air Committee and good friend of all airmen, Lord Montagu, said in words something like these :

It is the penalty of all pioneers to receive bricks and kicks ; to be scoffed and jeered at ; to be intensely disliked for being right in their anticipations. When their work comes to fruition and they see the good seed sown produce a bumper harvest, they can feel they have been of some little use to their country, and the satisfaction comes that none can remove.

But satisfaction must not make the pioneers torpid, they must still press for air progress.

The figures for the 1928-29 Estimates for the Fighting Forces are now to hand. Provision has been made for £114,600,000 for defence purposes. Out of this sum the Navy takes £57,300,000, the Army takes £41,050,000, the Air takes £16,250,000. Once more I have to record that the Air Service gets less than one-seventh of the total amount available for defence. The danger to this country, the heart of the great British Empire, is from the air, and still we find the older Services taking most of the money provided for defence purposes.

That alone shows how necessary it is to establish a Minister of Defence who can take the broad view and consider which fighting arm should be brought forward and which retarded.

Our first-line air machines are about half the number maintained by France. Our civil machines are a microscopic number when compared with those of France and Germany. All their civil machines can be turned into war machines at short notice.

It seems to me suicidal for this country not to have an Air Service on an equality with that maintained by the leading nations of Europe.

It is within my knowledge that to-day Germany is in an exceedingly strong position in the air and her air industry is well organized. Many of our air squadrons are in distant lands and cannot easily be summoned home in case of need. Whereas other European Powers have their detached machines within easier flying distance, and in a final question I ask my countrymen and women : Is it quite wise, when London is but a few minutes from aerial destruction to have the number of our first-line air machines approximately half the number of our nearest neighbour ? Again I submit to them this is not prudent and should be remedied at the earliest possible moment.

In conclusion, may I recall that when I commenced air work in the early autumn of 1909 the numbers interested in the air

were probably not more than a few hundreds ; now many millions are interested in air matters. Thousands and thousands have flown and are eager to fly again. We are on the verge of great air developments throughout the whole world. This is best shown by the many wonderful long flights made in 1927 and 1928. Some of these were undertaken by our own intrepid pilots. Their good efforts are helping to build up the imperial chain of communications that will bind still closer together the whole of the British Empire.

Men of great brains, initiative, resource, and energy in all progressive countries are turning their attention to the new science of aeronautics. There is no doubt that the airman and the aeronautical engineer are changing the conditions, for the better, for a very great number of their fellow countrymen.

LIST OF BOOKS FROM WHICH INFORMATION HAS
BEEN GATHERED

The Great Delusion, by "Neon."
Will Civilization Perish? by Commander Kenworthy.
The Grand Fleet, 1914-16, by Viscount Jellicoe.
The First World War, by Colonel Repington.
Winged Defence, by General Mitchell.
The Navy in Battle, by Arthur Pollen.
The World Crisis, by Winston Churchill.
Winston Churchill, by "Ephesian."
Tanks, by Sir Albert Stern.
German Air Raids on Great Britain, by Captain Joseph Morris.
In the Side Shows, by Captain Wedgwood Benn.
The War in the Air, by Sir Walter Raleigh.
Land, Sea and Air, by Admiral Mark Kerr.
Defence of London, by Colonel Rawlinson.
India by Air, by Sir Samuel Hoare.

LIST OF PAPERS, JOURNALS, MAGAZINES, ETC., FROM
WHICH EXTRACTS HAVE BEEN TAKEN

<i>The Times.</i>	<i>Hansard.</i>
<i>The Morning Post.</i>	<i>Blackwood's Magazine.</i>
<i>The Daily Telegraph.</i>	<i>Engineering.</i>
<i>The Daily Mail.</i>	<i>The Saturday Evening Post.</i>
<i>The Daily Express.</i>	<i>The Evening News.</i>
<i>The Daily Mirror.</i>	<i>English Life.</i>
<i>Aeroplane.</i>	<i>Empire Review.</i>
<i>Flight.</i>	<i>Naval and Military Dispatches,</i>
<i>Air League Bulletin.</i>	Volumes VIII and IX.
<i>Air.</i>	<i>The Nation</i> , No. 3255.
<i>Evening Standard.</i>	<i>Illustrated War News.</i>
<i>Naval and Military Record.</i>	<i>The World To-day.</i>

APPENDIX I

The Royal Commission on Awards to Inventors

CLAIMS IN RESPECT OF "INVENTION OF TANKS"

By the following claimants, namely—

Major-General E. D. Swinton.
Lieut.-Colonel F. L. M. Boothby.
Commodore F. M. Sueter.
Lieut. R. F. Macfie.
Mr. A. C. Nesfield.
Major T. G. Hetherington.
Sir Eustace H. Tennyson-D'Eyncourt.
Colonel Crompton and Mr. Le Gros.
Sir William Tritton and Major Wilson.
Mr. L. E. de Mole.

THE Commission have examined all the above claims in immediate succession and consider it advisable to embody their recommendations in a single document.

In the first place, the Commission desire to record their view that it was primarily due to the receptivity, courage, and driving force of the Rt. Hon. Winston Spencer Churchill that the general idea of the use of such an instrument of warfare as the "tank" was converted into a practical shape. Mr. Winston Churchill has very properly taken the view that all his thought and time belonged to the State, and that he was not entitled to make any claim for an award, even had he wished to do so. But it seems proper that the above view should be recorded by way of tribute to Mr. Winston Churchill.

MAJOR-GENERAL SWINTON'S CLAIM

This officer, acting outside the scope of his general duties, made an important contribution to the invention and adoption of the tank. This contribution included first the conception in October, 1914, of a machine-gun destroyer of the general character of the tank; secondly, the persistent, energetic, and successful advocacy from then onwards of the value and feasibility of the employment of such an instrument of warfare; and, thirdly, the specific definition in June, 1915, of the necessary characteristics of the weapon, the conditions of its use and the tests which it must be required to satisfy.

We conceive that the terms of reference to us do not contemplate the recommendation of awards for general services such as those secondly above-mentioned, but limit us to those which contributed to the invention and design of the actual weapon of warfare in question ; and in respect of these latter services we recommend an award of £1,000.

But beyond this we desire expressly to recognize the still greater value of that part of Major-General Swinton's work for which a pecuniary reward is not appropriate.

COMMODORE SUTTER'S CLAIM

This officer contributed in a definite degree to the evolution and adoption of the tanks. He appreciated at an early date and urged on Mr. Winston Churchill the importance of caterpillar traction for attack across country ; he organized the Diplock trials in February, 1915, and he was the main cause of the appointment of the D.N.C. Committee in the same month. We think that his services were of great value. But, on the other hand, he was acting throughout within the scope of the duties assigned to him, and no specific invention of great merit is attributable to him.

We consider that the case of this distinguished officer falls within the general rule to which we have given effect on previous occasions that (unless in quite exceptional circumstances) no award should be made to a servant of the Crown for the efficient discharge of duties definitely assigned to him.

CLAIMS OF LIEUT.-COLONEL BOOTHBY AND MAJOR HETHERINGTON

In each of these cases we consider that valuable services were rendered by the officer in question for which he deserves high credit. But inasmuch as in each case these services were rendered within the scope of the employment of the officer, and there was not any such exceptional invention or discovery as might possibly justify an award even under these circumstances, we are unable to recommend an award to either claimant.

CLAIMS OF MR. MACFIE AND MR. NESFIELD

These are separate claims, but we deal with them together because they are in effect rival claims to the merit attaching to the conception, embodiment, and communication of the same set of ideas. These ideas were of considerable value, but on a careful review of the evidence there is no conclusive proof that they were brought to the notice of or

communicated either directly or indirectly to the actual designers of the tank, so as necessarily to form a link in the chain of causation resulting in the evolution of the tank. In view, however, of the general similarity of these ideas, as evidenced by Mr. Nesfield's provisional specification with those embodied in the tanks, we have given these claimants the benefit of the doubt and credited them with some share in the evolution of the weapon, and we estimate the value of this share at £1,000. As between the two claimants, we think the credit should be divided equally and accordingly we recommend the award to each of them of a sum of £500.

SIR E. TENNYSON-D'EYNCOURT'S CLAIM

This is a claim with regard to which we have found much difficulty. This claimant undoubtedly rendered exceptional services as chairman of what has been called the "D.N.C." Committee in the selection and elimination of the various forms of design proposed, and particularly in the determination of those features of the tank which were concerned with armament; and he was acting outside his duties as Director of Naval Construction. On the other hand, he was acting within the general scope of his duties as chairman of the committee in question, and further it was mobility rather than armament which formed the principal inventive feature of the tanks. On the whole, we recommend the award of a sum of £1,000 to this claimant.

JOINT CLAIM OF COLONEL CROMPTON AND MR. LE GROS

These claimants were employed for some six months as consulting engineers to the D.N.C. Committee at a substantial agreed remuneration. In the discharge of their duties they worked loyally and very hard, and no doubt supplied the Committee with useful data and sound advice. But they did not, in the result, invent or discover the special features subsequently incorporated in the tanks, and we cannot consider their services as of such an exceptional or extraordinary character as could alone justify an award in addition to their agreed salaries.

JOINT CLAIM OF SIR WILLIAM TRITTON AND MAJOR WILSON

It is to these two claimants that we attribute the credit of designing and producing in a concrete practical shape the novel and efficient engine of warfare known as the "tank"; and it is to them that in our judgment by far the largest award should be made, though allowance

has to be made for the special opportunities afforded to Major Wilson by his official position.

It was objected on behalf of the Crown that Sir William Tritton at any rate had been sufficiently remunerated by the contracts placed with his company. But it is to be observed, in answer to this, that the principal contracts were placed with another company, who were supplied with the working drawings of Sir William Tritton and Major Wilson without any separate payment, and who fixed a price which was subsequently accepted without any addition by Sir William Tritton's company. It was also objected on behalf of the Crown that some considerable defects in design were discovered when the tanks were originally used in the course of the Battle of the Somme. But it would seem that the conditions of actual use of the machines were much more stringent and protracted than those stipulated for by the Government when ordering them. And, further, the defects in question appear to us to have been no greater than those ordinarily discovered in course of putting into actual use and service any novel mechanical contrivances. Indeed, the fact that within a few weeks of the first use of the tanks on the Somme the Government ordered a very large additional number of the machines is the best proof of their generally satisfactory character.

We recommend that there be awarded to these claimants jointly the sum of £15,000.

CLAIM OF MR. L. E. DE MOLE

The case of this claimant was heard a few days after the conclusion of the other cases. We consider that he is entitled to the greatest credit for having made and reduced to practical shape, as far back as the year 1912, a very brilliant invention which anticipated and in some respects surpassed that actually put into use in the year 1916. It was this claimant's misfortune and not his fault that his invention was in advance of his time, and failed to be appreciated and was put aside because the occasion for its use had not then arisen. We regret exceedingly that we are unable to recommend any award to him. But we are bound to adhere to the general rule in such cases as these that a claimant must show a causal connection between the making of his invention and the use of any similar invention by the Government.

In estimating the value of the invention of the tanks for the purpose of the above recommendations, we have taken into account not merely the precise class of tanks which went into action at the Battle of the Somme, but also any modified or improved classes of tanks which may fairly be considered to result from the normal development of the

inherent potentialities of the original invention. But we have not taken into account any special or exceptional inventions which may subsequently have been applied and have resulted in substantial extra utility.

(Signed) CHARLES H. SARJANT (*Chairman*).
JAMES J. DOBBIE.
W. TEMPLE FRANKS.
A. C. COLE.
H. J. MACKINDER.
ROBERT YOUNG.

P. TINDAL ROBERTSON,
Secretary.

Date : 17th November, 1919.

APPENDIX II

Complete Specification

A TORPEDO-CARRYING SEAPLANE

No. 6938 ; 19th March, 1914

WE, MURRAY FRASER SUETER, Captain R.N., Director of Air Department, Admiralty, Whitehall, London, S.W., and DOUGLAS HYDE HYDE-THOMSON, Lieutenant R.N., of H.M.S. *Vernon*, Portsmouth, in the County of Hants, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following manner—

The invention relates to seaplanes (i.e. aeroplanes designed to rise from and alight upon water) which carry and launch automobile torpedoes. According to the invention the torpedo is directly suspended from the fusilage of the seaplane and as close thereto as is conveniently possible, and to enable this to be done the supporting and bracing members of the main floats of the seaplane are so arranged as to leave a clear space between the floats to accommodate the torpedo and enable it to be dropped between the floats into the water. The torpedo itself is supported in such manner as to prevent it swaying either laterally or longitudinally during flight of the seaplane and means are provided for launching or releasing the torpedo and simultaneously starting the engine without imparting any angular velocity to the torpedo.

To ensure release of the torpedo without imparting any angular velocity thereto, the torpedo should be supported either entirely at one point, preferably in the transverse plane through its centre of gravity, or if supported at more than one point the arrangement should be such that the release at all the points of suspension will be simultaneous.

In the case of a single point suspension auxiliary securing devices may be provided to give additional rigidity to the arrangement, both when the seaplane is on the water and in its flight through the air, but such auxiliary securing devices should be cast off prior to the actual release of the torpedo from its point of suspension.

In determining the longitudinal position of the torpedo with regard to the fusilage of the seaplane, it would in general be arranged that the relation of the centre of mass of the torpedo with respect to the centre of pressure of the supporting planes would be such that, upon the torpedo being released and the load carried by the supporting planes being consequently materially diminished, the seaplane would

continue its flight at the same horizontal angle at increasing speed, but it might alternatively be arranged that upon release of the torpedo the seaplane would automatically assume an upward inclination in continuing its flight. Further, the torpedo may either be supported at such a level as to clear the propeller of the aeroplane, in which case the nose of the torpedo may project beyond the propeller and the torpedo be given a forward velocity in launching, or it may be supported closer to the fusilage of the seaplane and lie entirely in rear of the propeller and within the path of the propeller tips, in which case the torpedo would simply be released in launching without imparting any forward velocity to it, although a rearward velocity might be imparted to it.

The means adopted for supporting and steadying the torpedo may assume many forms; thus, for example it may, as shown inside and front elevation in Figs. 1 and 2 of the accompanying drawings, be shackled to a longitudinal beam *a* fixed to the fusilage at an appropriate point with respect to the centres of mass and buoyancy, fore and aft inverted stirrups or saddles *b* being provided against which the torpedo is firmly pressed by the action of the supporting means so as to prevent swaying. The shackle may be simply released by mechanical means indicated at *c* operated from the pilot's seat *d*.

In an alternative arrangement, illustrated in side and front elevation in Figs. 3 and 4 and in plan in Fig. 5, the torpedo is fitted fore and aft with T-headed projections *e*, which are supported within correspondingly shaped *f* of a longitudinally sliding frame *g* (shown in section on an enlarged scale in Fig. 6) in such manner that when this frame is shifted through a comparatively small distance longitudinally the T-headed supports *e* are released simultaneously and the torpedo is free to drop into the water. The sliding frame *g* may be actuated by a small explosion cylinder *h*, the striker *i* of which is operated from the pilot's seat, or an electrically operated discharging mechanism may be used.

In Figs. 1 and 2 the torpedo *k* is shown as suspended longitudinally between the floats *jj* close under the body of the seaplane and entirely in rear of the propeller *m*, the tips of which extend beyond the torpedo, so that in launching the latter no forward velocity relative to the seaplane can be given to it.

In the constructions of Figs. 3, 4, and 5 the torpedo *k* is supported centrally at such a level as to clear the propeller *m* of the seaplane, the nose of the torpedo projecting forwardly some distance beyond the propeller, and in this case the torpedo may, if desired, be launched with a forward velocity relatively to the seaplane, or it may, as in the arrangement of Figs. 1 and 2, simply be dropped or may be given a rearward velocity relatively to the seaplane.

To accommodate the torpedo in a central position between the two

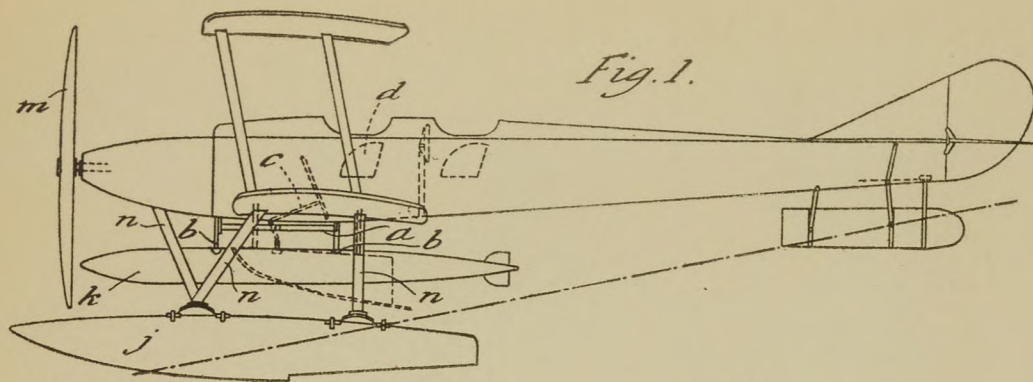


Fig. 1.

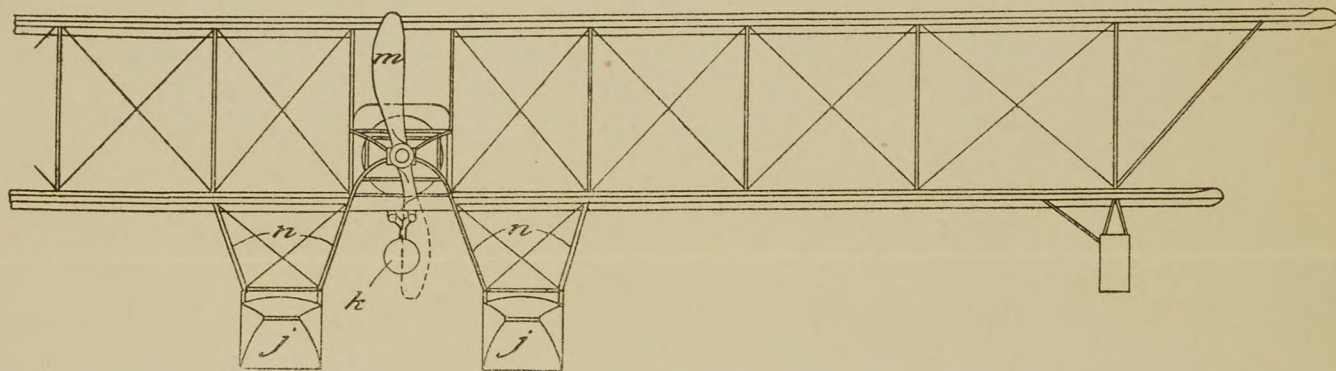


Fig. 2.

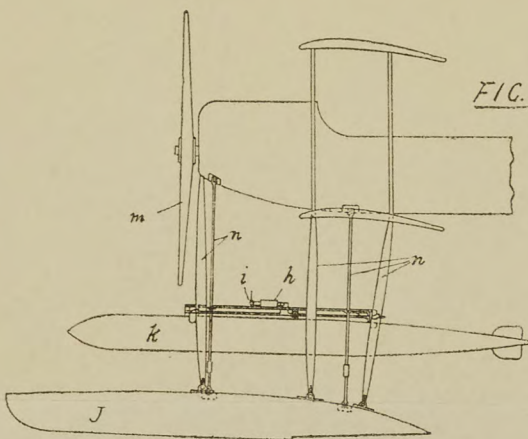


FIG. 3.

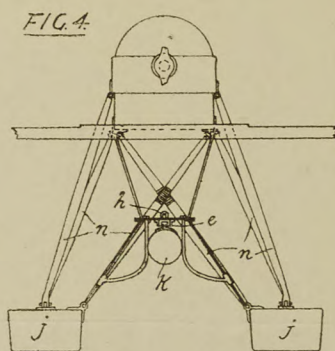


FIG. 4.

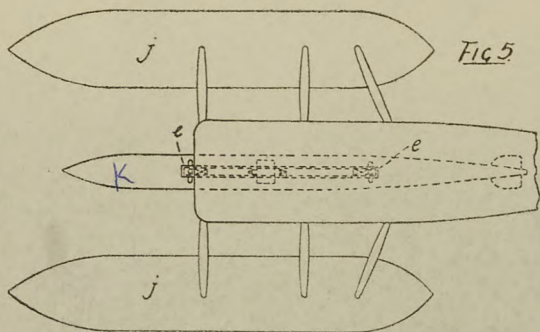


FIG. 5.

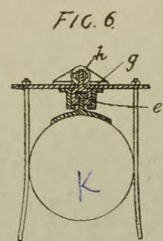


FIG. 6.

main floats and to enable it to be dropped therefrom into the water, the supporting and bracing members *n* are arranged so as to leave a clear space between the floats.

While the invention has hereinbefore been described with reference to the most usual type of seaplane as at present constructed, viz., that in which two main floats *jj* are provided, one on each side of the central longitudinal plane of the machine, it may also be applied with suitable modifications to other types; and, further, more than one torpedo may be carried. In the latter case, when the centres of mass of the torpedoes are not in the central longitudinal plane of the machine, counterbalancing weights may be provided which are released simultaneously with the launching or release of the torpedo. In the case of a seaplane having its main float or floats disposed in the central longitudinal plane of the machine, a torpedo may be carried along each side of such float or floats and preferably clear of the water when the plane is afloat, a suitable frame or frames being provided for the attachment and support of the torpedoes.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is—

1. A seaplane in which one or more torpedoes is or are directly supported from the fusilage and as close thereto as is conveniently possible, and on release the torpedo is dropped into the water either between the floats, or on one side of a central float.

2. A torpedo-carrying seaplane constructed substantially as herein described with reference to Figs. 1 and 2 of the accompanying drawings.

3. A torpedo-carrying seaplane constructed substantially as herein described with reference to Figs. 3-6 of the accompanying drawings.

Dated this 16th day of September, 1914.

(Signed) ABEL & IMRAY,
Agents for the Applicants.

29 SOUTHAMPTON BUILDINGS, W.C.

APPENDIX III

REPORT OF EXPERIMENTS CARRIED OUT WITH A HYDRO-AEROPLANE, WITH NOTES AND SUGGESTIONS FOR FURTHER EXPERIMENTS

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THESE experiments were carried out chiefly by Commander Schwann, in Cavendish Dock, Barrow-in-Furness, a suitable spot for experiments of this kind on account of the water being tideless and yet being only separated from the sea by a sea wall, in case long flights are required. The depth of the water does not exceed 9 ft., and the area of the dock is 142 acres.

The aeroplane is an Avro biplane fitted with a Green engine of 30-35 h.p. Before the test made on 18th November, when the machine rose from the water, the engine was fitted with additional exhaust ports giving it an extra 10 h.p. or so.

The experiments have consisted so far in trying various types of floats to fix to the aeroplane to enable it to rise from the water by its own power.

This has already been done by Curtiss, in America, and Messrs. Fabre and Colliex, in France. The machines of these three aviators are all fitted with higher powered engines than is the Avro, and also carry front elevators, which the Avro does not possess. It was, therefore, felt that the apparatus used in France and America could not be relied on to be of much use with the Avro machine.

To avoid impairing the known good flying qualities of the aeroplane it was decided that, until a successful design of float had been evolved, no alteration should be made to the aeroplane, other than the removal of the landing wheels, that could possibly be avoided. The floats were, therefore, only lashed to the skids of the machine in an extemporized manner. Also it was not thought necessary to fit any shock absorbers to the floats, until a successful type of float had been evolved, so this matter was put aside for the time being.

The following is a description of the various experimental floats tried and the results obtained—

Mark I Float. Fig. 1. Page 437. Two narrow flat-bottomed floats designed by Commander Schwann made of wood and aluminium, each

¹ Issued by the Advisory Committee for Aeronautics.

12 in. long, 12 in. deep, and 12 in. wide, lashed to the skids of the machine. Weight of the two floats 76 lb.

The machine was first mounted on the floats with its axis parallel to the axis of the floats and in such a position that when floating on the water with the pilot in the machine the bottom of the floats was at an angle of about 5° to the horizontal. This caused the tail of the machine to come inconveniently near the water and caused a small float, which had been placed on the tail skid to keep the tail out of the water, to make a heavy wash. The tail skid and float were therefore removed and the rudder was shifted upwards until about two-thirds of its area was above the axis of the machine. A speed of about 18 knots was then obtained with these floats, but there was a considerable wash astern, and the machine would not lift. The floats were then shifted further aft along the skids of the machine until when at rest the floats were at an angle of $\frac{1}{2}$ a degree to the horizontal, pointing upwards and forward. A trial was made with this arrangement, but on leaving the shed, with a slight following wind, the aeroplane capsized forwards and turned completely over.

These floats were taken off and re-designed.

Mark II Float. Fig. 2. One main float designed by Lieut. Boothby in the centre, between the skids, and two small steadying floats under each wing tip. Main float 13 ft. by 3 ft. wide by 12 in. deep, made of duralumin channel bar framework covered with canvas, the inside being filled with bags of air under pressure.

Stern of main float curved downwards to meet the bottom. Total weights of main and wing floats and attachments about 60 lb. This method of construction gives great saving in weight and minimizes the danger of losing the buoyancy of the floats due to leakage, after a heavy blow on them.

Difficulty was found, however, in making the outer cover watertight, and also there was appreciable deformation of the shape of the floats, causing considerable resistance. The main float was set at various angles to the horizontal and the axis of the machine set at various angles downwards relative to the float; but a slow speed only was obtained.

The floats on the wing tips were fitted with small duralumin plates on their undersides, and these acted well in keeping the wings clear of the water. At rest and at slow speed one or other of the wing floats was on the water all the time.

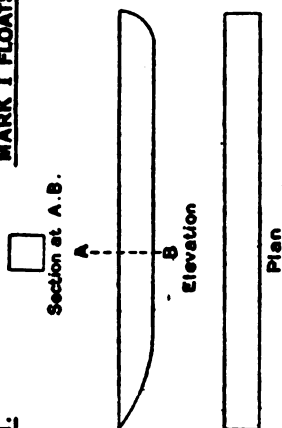
Mark III Float. Consisted of Mark II float with a hydroplane step in the bottom at about the centre of the float.

Result: No improvement on Mark II float.

Mark IV Float. Fig. 3. Two narrow floats, designed by Lieut. Boothby, of triangular section lashed under the skids of the machine

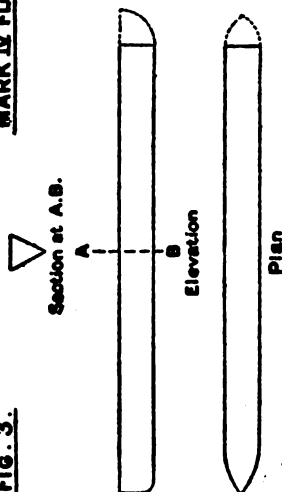
MARK I FLOATS

FIG. 1.



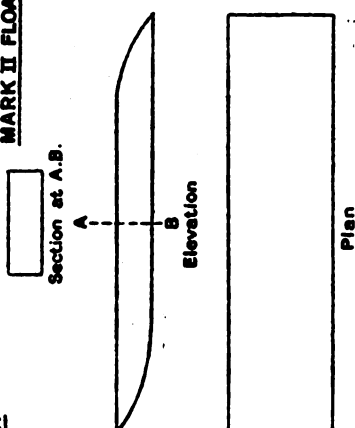
MARK IV FLOATS

FIG. 3.



MARK II FLOAT

FIG. 2.



MARK VII FLOATS

FIG. 4.

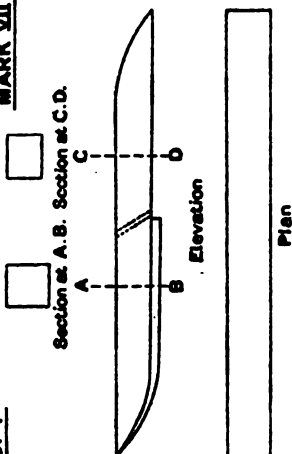


FIG. 5.



Figs. 1 to 4 Direction of motion to the left
Fig. 5 Direction of motion to the right



Illustrating Presumed Theory of Hydroplanes
Centre of Gravity of floats and aeroplanes somewhere between A&B
θ, θ' angles of planes when hydroplaning (not necessarily equal).

with their apex downwards. Each float 13 ft. long and sides 12 in. wide. Made of duralumin channel bar framework, covered with canvas and filled with bags containing air under compression. These floats showed some promise, a good speed being obtained with them. Attempts at reducing the wash astern by rounding off the stern did not meet with success, possibly because the extensions to the stern were not well put on. (*N.B.* These floats with the rounded sterns were named Mark V floats. The extensions are shown dotted in Fig. 3.) The weight of the two floats was 46 lb. only. Various settings of the inclination of the axis of the float to the horizontal were tried, the after end of the machine being raised above the skid so as to keep the axis of the aeroplane about horizontal in each case.

Mark VI Floats. These were Mark IV floats fitted with two planes under the water between the two floats, as designed by Capt. Sueter and Lieut. Boothby. These planes were made of duralumin plate. Their span was 40 in., chord 4 in., and the distance apart 4 in. The planes were mounted one above the other at a depth of 20 in. below the water level and at an angle of 3° to the horizontal. Each plane was slightly curved to a depth of $\frac{1}{4}$ in.

Considerable lift was obtained with this arrangement, but the weeds in the dock fouled the planes and made the test of speed of no value.

Mark VII Floats. Fig. 4. Consisted of Mark I floats considerably re-designed, a 3-in. step being formed in the centre of the bottom of the floats, the floats being lengthened to 13 ft. and widened to 15 in., and the sterns being curved downwards to the flat bottom. An ample air supply was led through the floats to the after side of the steps. The machine was mounted on these floats with its axis at an angle of $4\frac{1}{2}^\circ$ to the line of the bottom of the floats. Weight of both floats 105 lb. Before trying Mark V floats the planes of the machine were overhauled and new ribs put in. The engine was sent to the makers and was fitted with additional open exhaust ports. This increased its power considerably, possibly an extra 5-10 h.p. being obtained. These floats were tried on 18th November, 1911. The machine at once hydroplaned on leaving its shed, and after just leaving the water several times, eventually rose some 15 to 20 ft. in the air. The rising was rather sudden and the balance of the machine was lost, causing it to come down, making rather a bad descent and damaging the left wing and the floats.¹ Two points to be noted in this successful trial are that no excessive hammering of the floats on the water was noticed and that the rising of the machine was undoubtedly not due simply to jumping off from a wave.

¹ *N.B.* It should be borne in mind that Commander Schwann had never had any experience in flying before. Nevertheless he claims to be the first man to fly off the water in England. Mr. Sippe subsequently made some good flights with the machine fitted with the same floats and identical in every respect.

The following points should also be noted—

¹ (1) It is not known yet whether the success obtained with the Mark VII floats shows that these floats are superior in design to the previous floats, or whether it was not due simply to the extra power obtained from the engine when trying these floats.

(2) The propeller in a hydroplane is very liable to damage. The slightest spray striking it will score the leading edge of the blades and eventually break them. In fact when running the propeller with the machine held at rest in the water, the suction will cause water to fly into the blades and damage them.

After breaking several propellers, the trouble has been overcome to a certain extent by covering the blades with linen, but perhaps Mr. Barber's patented method of depositing copper on the blades will have to be adopted.

(3) Trouble has been experienced with the warping of the wood of the wings after they have been wet. This rather points to the necessity of using metal for the framework of Naval aeroplanes.

(4) The aluminium used in the construction of some of the floats has suffered considerably from the action of the salt water on it. This has been temporarily overcome by the use of "Astral" varnish coated over the aluminium surfaces inside and out, but this would scarcely do for a permanency.

(5) With a shape of stern similar to that of Mark VII float, on alighting on the water and stopping the engine, if there be any wind to drive the aeroplane astern, the floats are very liable to dive down by the stern.

The following are some points about which it appears difficult to obtain information, and about which information is much needed—

(1) What is considered to be the best shape for a hydroplane?

(2) What are the relative values, as regards speed obtained with a given power, of hydroplanes with one, two, or three steps?

(3) At what angle to the horizontal does a hydroplane most easily hydroplane and obtain the maximum speed?

(4) What is the best shape of stern for a hydroplane?

(5) How far apart should floats (of the type Mark VII, say) be placed so that the meeting of the bow waves of each does not affect the speed?

Note. In considering query (3) it is presumed that a hydroplane travels on the tips of its steps, and that its hydroplaning angle is therefore the angle between the line of its bottom and the line joining the tips of the steps, or the one step and the stern of the float (*vide* Fig. 5).

¹ Mark IV floats were tried subsequently to preparing this report with the engine giving its extra power, but the machine would not rise from the water.

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